Rate Constants for Reactions of Aliphatic Carbon-Centered Radicals in Aqueous Solution

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Absolute rate constants for reactions of aliphatic carbon-centered radicals in aqueous solutions have been compiled and evaluated from the literature. Rate constants are included for reactions of radicals with inorganic and organic compounds and for decay by radical–radical reactions. The radicals were generated by radiolysis, photolysis, or other techniques, and their rate constants were determined generally by kinetic spectrophotometry. The tables include data for over 2,500 reactions of 373 radicals from 740 literature references. © *1996 American Institute of Physics and American Chemical Society.*

Key words: Alkyl radicals; aminoalkyl radicals; aqueous solution; benzyl radicals; chemical kinetics; haloalkyl radicals; hydroxyalkyl radicals; photolysis; radiolysis; rate constants.

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1. Introduction

Alkyl radicals and substituted alkyl radicals are important reactive intermediates formed in certain reductions and oxidations of organic and biological materials. Because of their importance in biological systems, in atmospheric reactions,

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and in industrial processes, they have been the topic of numerous investigations. Earlier studies have been discussed in several reviews[1,2] and the kinetic results were summarized in several compilations.[3,4] Many direct measurements of absolute rate constants for reactions of carbon-centered radicals in solution have been reported. The present compilation is intended to evaluate the available rate constants in aqueous solution and to present them in a concise and readily accessible form. The tables include over 2,500 reactions of 373 radicals, compiled from 740 literature references. The data presented here are also included in the NDRL/NIST Solution Kinetics Database.[5] A brief description of the methods of production of the radicals and of determination of their rate constants, as well as the general patterns of radical reactions, are given below.

2. Production of Aliphatic Carbon-Centered Radicals

2.1. Radiolysis

Alkyl and substituted alkyl radicals are produced in irradiated aqueous solutions by the reactions of e^-_{aq}, H$^\cdot$, or $^\cdot$OH radicals with various organic compounds. If the $^\cdot$OH radical is to be used, the solutions typically contain N_2O to convert the e^-_{aq} into $^\cdot$OH, thus increasing the yield of the desired alkyl radical and reducing possible complications arising from other reactions of the electron.

$$H_2O \rightsquigarrow e^-_{aq} + H^\cdot + {}^\cdot OH + H_2 + H_2O_2, \quad (1)$$

$$e^-_{aq} + N_2O \rightarrow N_2 + OH^- + {}^\cdot OH. \quad (2)$$

If the hydrated electron is to be used to produce the desired alkyl radical, the $^\cdot$OH radical cannot be converted readily to the hydrated electron, but often can be converted to a reducing radical capable of producing more of the desired alkyl radical. Otherwise, if the $^\cdot$OH is scavenged by an additive to form a nonreducing radical, the secondary products arising from the $^\cdot$OH must be taken into account in the kinetic analysis.

(a) Many alkyl radicals have been formed by hydrogen abstraction from a solute upon reaction with $^\cdot$OH and H$^\cdot$.

$$^\cdot OH + RH \rightarrow H_2O + R^\cdot, \quad (3)$$

$$H^\cdot + RH \rightarrow H_2 + R^\cdot. \quad (4)$$

This can result in a mixture of several alkyl radicals, depending upon the structure of the solute and the selectivity of the reacting radicals. The $^\cdot$OH radical is very nonselective and is used primarily to produce radicals from simple precursors, for example methanol, acetone or acetonitrile, each of which produces only one alkyl radical. For 2-propanol, which is slightly more complex, 86% of the alkyl radicals will be secondary while 13% will be primary. When $^\cdot$OH is allowed to react with precursors containing unsaturated bonds or aromatic moieties, the situation may be even more complex, with the formation of OH-adduct radicals along with radicals formed by abstraction. Rate constants for a large number of hydroxyl radical reactions are summarized in a recent compilation[6] and in the Solution Kinetics Database.[5] Hydrogen atoms are somewhat more selective than $^\cdot$OH radicals in their reaction at different sites of a solute molecule, but because of their lower yield in the radiolysis of water they have a smaller contribution to the total yield of radicals.

(b) Certain carbon-centered radicals were produced by the addition of H$^\cdot$ or $^\cdot$OH to unsaturated aliphatic compounds.

$$^\cdot OH + R_2C{=}CR_2 \rightarrow R_2\dot{C}C(OH)R_2, \quad (5)$$

$$H^\cdot + R_2C{=}CR_2 \rightarrow R_2\dot{C}CHR_2. \quad (6)$$

This method was used in a limited number of cases and suffers from two restrictions: (1) to produce a single radical the compound has to be symmetric about the double bond, and (2) if the molecule contains reactive sites such as allylic or doubly allylic, hydrogen abstraction may occur with a substantial yield to form a different radical. Reaction of $^\cdot$OH with a triple bond forms a hydroxyvinyl radical which isomerizes to an oxoalkyl radical.

(c) Many simple alkyl radicals can be formed by the reaction of $^\cdot$OH with alkyl sulfoxides via an addition/fragmentation mechanism.[7]

$$^\cdot OH + R_2SO \rightarrow R_2SO(OH) \rightarrow RSO_2H + R^\cdot. \quad (7)$$

Since the rate constants for reaction of $^\cdot$OH with the sulfoxides are $>10^9$ L mol^{-1} s^{-1} and the lifetimes of the OH adducts are <200 ns, the radicals R$^\cdot$ are produced in $<1\times10^{-6}$ s after the pulse in 0.01 mol L^{-1} sulfoxide solutions. With the higher alkyl sulfoxides, a fraction of the $^\cdot$OH radicals may react via H abstraction.

(d) Alkyl radicals are also produced by reaction of e^-_{aq} with halogenated organic compounds, leading to reductive elimination of a halide ion. The $^\cdot$OH radicals can be removed by scavenging them with 2-PrOH, Eq. (9), or with formate ions, Eq. (10).

$$e^-_{aq} + RX \rightarrow X^- + R^\cdot, \quad (8)$$

$$^\cdot OH + (CH_3)_2CHOH \rightarrow H_2O + (CH_3)_2\dot{C}OH, \quad (9)$$

$$^\cdot OH + HCO_2^- \rightarrow H_2O + CO_2^{\cdot-}. \quad (10)$$

The radical from 2-PrOH will reduce some halogenated compounds (such as CCl_4 or CH_3I) to produce more of the desired radical.[8]

$$(CH_3)_2\dot{C}OH + RX \rightarrow R^\cdot + X^-(CH_3)_2CO + H^+. \quad (11)$$

Many halogenated compounds, however, do not react rapidly with $(CH_3)_2\dot{C}OH$. The reaction of $CO_2^{\cdot-}$ with halogenated compounds is slow, even that with CCl_4.

(e) Alkyl radicals have been produced also by reaction of e^-_{aq} with alkylammonium derivatives, a reaction that proceeds by reductive elimination of ammonia.[9]

$$e^-_{aq} + C_6H_5CH_2NH_3^+ \rightarrow C_6H_5\dot{C}H_2 + NH_3. \quad (12)$$

Elimination of ammonia occurs only when the amino group is protonated and the α-carbon bears an electron withdrawing group such as carbonyl or phenyl. However, the process is not always quantitative; diphenylmethylammonium deaminates to 95%, but benzylammonium undergoes deamination

corresponding to only 70% of the e^-_{aq}. The rest of the hydrated electron reactions occur via ring addition and protonation to give an H adduct.

(f) Hydroxyalkyl radicals have been produced also by the addition of e^-_{aq} to a carbonyl group, followed by protonation.

$$e^-_{aq}+R_2CO\rightarrow R_2\dot{C}O^-, \quad (13)$$

$$R_2\dot{C}O^-+H^+\rightleftarrows R_2\dot{C}OH. \quad (14)$$

2.2. Photolysis

The main photochemical method for production of alkyl radicals, employed in the studies summarized here, is the photolysis of alkyl-metal complexes,[10] e.g.,

$$RCo^{III}L+h\nu\rightarrow R^{\cdot}+Co^{II}L. \quad (15)$$

Other photochemical methods include the reductive quenching of triplet ketones with an alcohol, amine, or phenol,[11–13] e.g.,

$$^3R_2CO+R_2CHOH\rightarrow 2\ R_2\dot{C}OH, \quad (16)$$

$$^3ArCOR+ArOH\rightarrow ArO^{\cdot}+Ar\dot{C}OHR, \quad (17)$$

and

$$^3ArCOR+R_2CHOH\rightarrow Ar\dot{C}OHR+R_2\dot{C}OH, \quad (18)$$

followed by,

$$ArCOCH_3+R_2\dot{C}OH\rightarrow Ar\dot{C}OHCH_3+R_2CO. \quad (19)$$

Other methods which have been used are oxidative decarboxylation of benzilic acid photosensitized by uranyl ion,[14] photolysis of 2,4-dihydroxy-2,4-dimethyl-3-pentanone,[15] and the photolysis of H_2O_2 followed by reaction of $^{\cdot}OH$ with an organic solute.[16]

2.3. Chemical Methods

Chemical methods also have been used to produce certain alkyl radicals. These include Fenton-like systems, where Fe^{II} or Ti^{III} ions react with H_2O_2 to produce $^{\cdot}OH$ radicals, which then react with organic solutes to form other radicals. Alkyl radicals have also been generated by thermal homolysis of organometallic compounds, such as certain chromium species[17] containing alkyl or substituted alkyl groups attached to the chromium by a carbon-metal bond.

3. Determination of Rate Constants

3.1. Time-Resolved Methods

Most of the rate constants compiled here were determined by kinetic spectrophotometric methods, i.e., by following the increase in the optical absorption of a product (p.b.k.) or the decrease in the optical absorption of a reactant (d.k.), either the radical or the reacting molecule. In those cases where neither the reactants nor the products exhibit sufficient absorption in a range that can be monitored under the applied conditions, the rate constants were determined by one of the following methods. Another reactant is added as an indicator molecule, or a probe, which is an absorbing species that can be monitored, or which reacts to yield an absorbing species that is readily monitored. When the indicator is present at a constant concentration and the reactant of interest is added at various concentrations, one can derive the rate constant from a linear plot of the observed rate vs concentration.[18] Alternatively, the rate constants were determined by competition kinetics (c.k.), where a reference reactant (R), that reacts with a known rate constant (k_R) and yields an absorbing species, is added as a competitor and the optical absorbance after the reaction is determined at various concentrations of the two reactants. From the absorbance in the absence (A_0) and in the presence (A) of various concentrations of a compound (S) one calculates its rate constant (k_S) from the equation: $A_0/A-1=(k_s[S])/(k_R[R])$.[17,19,20]

A number of rate constants were determined by using other monitoring techniques. Several studies utilized the esr signal of a radical to follow its formation or decay.[21,22] In several cases, changes in the conductance of the solution were monitored. This method is particularly suitable for reactions that involve changes in concentration of the strongly conducting species H^+ and OH^-.[23,24]

3.2. Other Methods

The time-resolved methods outlined above utilize optical absorption, conductance, or esr signals to follow the changes in concentration as the reaction progresses. The initial concentration of radicals in these methods generally is in the micromolar range or higher, so that radical–radical reactions may have a significant contribution and may limit the ability to monitor relatively slow radical–molecule reactions. Rate constants for such reactions often have been determined or estimated from steady-state experiments, where the radical concentration is relatively low. Rate constants were determined from yields of products based on competition kinetics using a reference compound or based on competition with radical–radical termination reactions. In some of these studies, the steady-state concentration of a radical was obtained from esr measurements and the rate constant derived from the assumed mechanism and the termination rates.

4. Reactions of Aliphatic Carbon-Centered Radicals

All of the radicals included in this compilation are short-lived and react relatively rapidly with other molecules present in solution or with each other. Most radical–radical reactions take place with rate constants generally in the range of 10^8 to 10^9 L mol^{-1} s^{-1}, except for highly charged species which decay more slowly due to electrostatic repulsion. Therefore, reactions of radicals with solutes can be observed only if they effectively compete with the second-order decay. In the pulse radiolysis and flash photolysis experiments used in most of the studies compiled here, the radical concentrations that can be monitored generally are between 10^{-6} and

10^{-4} mol L^{-1} so that their half-lives are in the microsecond to millisecond time range. Considering that the concentration of the reacting solute may be limited due to solubility or to prevent undesired reactions, the lower limit of the rate constants that can be measured by these methods is generally 10^5 L mol^{-1} s^{-1} or higher. Only a few rate constants lower than this have been reported and they have been measured or estimated by other techniques.

4.1. Reactions With Oxygen

Most of the radicals included here react very rapidly with O_2 with k of the order of 10^9 L mol^{-1} s^{-1}. In most cases the reaction is via addition to form a peroxyl radical, but in the case of $CO_2^{\cdot-}$ the reaction may be via electron transfer to yield $O_2^{\cdot-}$ directly.

$$R^{\cdot}+O_2 \rightarrow ROO^{\cdot}, \quad (20)$$

$$CO_2^{\cdot-}+O_2 \rightarrow CO_2+O_2^{\cdot-}. \quad (21)$$

Certain hydroxyalkyl and aminoalkyl radicals react with O_2 by addition to form peroxyl radicals, but these are unstable and eliminate $O_2^{\cdot-}$.

4.2. Reduction of Substrate

The majority of the rate constants reported in this compilation are for reduction of inorganic and organic compounds by the strongly reducing radicals $CO_2^{\cdot-}$, $(CH_3)_2\dot{C}OH$, $(CH_3)_2\dot{C}O^-$, and similar radicals derived from methanol and ethanol. In general, alkyl radicals that have a hydroxy or an amino group[25] on the same carbon as the unpaired electron have reduction potentials in the range of -1 to -2 V vs NHE[26] and thus can reduce many compounds [quinones (Q), nitro compounds, porphyrins, higher oxidation state metal ions and complexes, etc.], e.g.,

$$(CH_3)_2\dot{C}OH+Q \rightarrow CH_3COCH_3+H^++Q^{\cdot-}. \quad (22)$$

The reduction was assumed to take place in general via electron transfer, but in a number of cases it has been shown to occur via an addition-elimination mechanism.[24,27]

4.3. Hydrogen Abstraction

H abstraction was reported mainly for weakly bonded H atoms, such as those in SH groups.[28]

$$^{\cdot}CH_3+C_2H_5SH \rightarrow CH_4+C_2H_5S^{\cdot}. \quad (23)$$

These reactions are generally slower than the reductions mentioned above.

4.4. Addition to Substrate

Alkyl radicals also react by addition to unsaturated bonds.[29]

$$^{\cdot}CH_2OH+CH_2{=}CHCO_2H \rightarrow HOCH_2CH_2\dot{C}HCO_2H. \quad (24)$$

These reactions are generally slow. Alkyl radicals react rapidly with many reduced metal ions via addition to form organometallic compounds. Some of these adducts are relatively stable whereas others may decompose rapidly by various mechanisms.[30]

$$\text{(a)}\quad (CH_3)_2COH+Cr^{2+} \rightarrow CrC(CH_3)_2OH^{2+}, \quad (25)$$

$$CrC(CH_3)_2OH^{2+}+H_2O \rightarrow Cr^{3+}+2\text{-PrOH}+OH^-, \quad (26)$$

$$k(25)=5\times10^7 \text{ L mol}^{-1}\text{ s}^{-1},$$

$$k(26)=1.5 \text{ s}^{-1} \text{ at pH } 5^{31}.$$

$$\text{(b)}\quad {}^{\cdot}CH_2C(CH_3)_2OH+Cu^+ \rightarrow CuCH_2C(CH_3)_2OH^+, \quad (27)$$

$$CuCH_2C(CH_3)_2OH^+ \rightarrow CH_2{=}C(CH_3)_2+Cu^{2+}+OH^-, \quad (28)$$

$$k(27)=4.5\times10^9 \text{ L mol}^{-1}\text{ s}^{-1},$$

$$k(28)=2.2\times10^5 \text{ s}^{-1} \text{ at pH } 2.7^{32}.$$

$$\text{(c)}\quad {}^{\cdot}CH_3+MnNTA^- \rightleftarrows CH_3MnNTA^-, \quad (29)$$

$$k(29)=1.5\times10^8 \text{ L mol}^{-1}\text{ s}^{-1}, \text{ and}$$

$$k(-29)=1.2\times10^5 \text{ s}^{-1}\ ^{33}.$$

4.5. Oxidation of Substrate

Carbon-centered radicals containing a carbonyl group at position β, such as $^{\cdot}CH_2CHO$, due to partial spin density on the oxygen, are oxidants toward phenoxide ions, TMPD (N,N,N',N'-tetramethyl-p-phenylenediamine), ascorbate, ferrocyanide, and other reductants.[34,35]

$$^{\cdot}CH_2CHO+ArO^-+H^+ \rightarrow CH_3CHO+ArO^{\cdot}, \quad (30)$$

$$^{\cdot}CH_2CHO+TMPD+H^+ \rightarrow CH_3CHO+TMPD^{\cdot+}, \quad (31)$$

$$^{\cdot}CH_2CHO+Fe(CN)_6^{4-}+H^+ \rightarrow CH_3CHO+Fe(CN)_6^{3-}. \quad (32)$$

5. Arrangement of the Tables

Tables 1–6 cover unsubstituted alkyl radicals containing only carbon and hydrogen. Tables 7–11 cover halogen substituted alkyl radicals. Tables 12–17 contain reactions of monohydroxyalkyl radicals; other hydroxyalkyl radicals are collected in Table 27. Tables 18–25 include alkyl radicals substituted with alkoxy, carboxy, and hydroxy groups. Table 26 contains data for the radical from formate (carboxyl radical, carbon dioxide radical anion). Reactions of other substituted alkyl radicals have been collected in Table 27. Benzyl and ketyl radicals, having an aromatic moiety adjacent to the radical site, are collected in Tables 28–30.

Reactions for a radical with inorganic substrates, arranged alphabetically in order of the principal element, are followed by reactions with organics arranged in alphabetical order by name. Systematic names have been used whenever possible. The Chemical Name Index (Sec. 11) contains names and

synonyms for both radical and substrate as an aid in locating specific reactants. When more than one radical may be involved the radicals are identified only by their origin and given a name such as "Radicals from glucose."

The reactions are given in column 2 by the use of line formulas whenever possible, or else abbreviations and symbols. The name of the substrate is given with each numbered entry. The name of the radical is given in the table heading. Tables 6, 11, 27, 29, and 30 contain more than one radical and the arrangement is alphabetical by the name of the radical. Products are listed only for those reactions for which evidence has been obtained on the nature of the products; in some cases only the reaction type is given, e.g., addition, electron transfer, etc.

Values of k are in units of L mol^{-1} s^{-1} which is given at the top of the column; the unit of s^{-1} is given with the value of k when it refers to a first-order reaction or a bimolecular reaction with water. Rate constants have been rounded to two significant figures and the author's error limits have been omitted. Most of the rate constants in these tables have uncertainties of ±10% to ±20%. In cases where the quoted error is large, the value has been rounded to one significant figure. Upper and lower limits are indicated when reported. Rate constants for second-order decay of the radicals are given as k (not $2k$) where $-\mathrm{d[R]}/\mathrm{d}t = 2k[\mathrm{R}]^2$ has been determined. The molar absorptivity, ε, used to calculate k in optical studies is given in the Comments column. Rate constants for certain reactions have been determined with reference to the rate constant of another reaction; in those cases the reference values and the reference reactions are listed in the Comments column.

The pH and ionic strength are quoted whenever they have been reported; in some cases the pK_a of the substrate is given in the Comments column as an indication of the possible ionic forms of the substrate. The pK_a's have not been evaluated by the present authors. In some entries, pK_a's for the radicals have been quoted when reactions of the radicals in different ionic forms are presented. Temperature is assumed to be ambient when not otherwise specified.

The Method column indicates the method for generation of the transient and in the Comments column the method of measurement is given along with the source of the transient and other data such as activation energy, activation enthalpy, activation entropy, activation volume, etc. When the symbol R is used in a Comment, such as in G(R) or k(R+R), it refers to the radical of the same entry.

References to the tables are listed by the serial number from the Radiation Chemistry Data Center bibliographic data base, from which the reference list (Sec. 9) was generated. The first two digits of the serial number represent the year in which the work was published.

Indexes have been produced for the radicals and substrates by (1) molecular formula (Sec. 10) and (2) chemical names and synonyms (Sec. 11). The indexes follow the tables and refer to the entry in the tables in which the chemical species is a reactant.

6. List of Abbreviations and Symbols

A	frequency factor
abs.	absorption
abstr.	abstraction
ABTS	2,2′-azinobis(3-ethylbenzothiazoline-6-sulfonate)
Ac	acetyl
AcOH	acetic acid
addn.	addition
alk.	alkaline
anal.	analysis
bpy	2,2′-bipyridine
bpz	2,2′-bipyrazine
BuOH	butanol
tert-BuOH	*tert*-butyl alcohol (2-methyl-2-propanol)
calcd.	calculated
chem.	chemical
c.k.	competition kinetics
condy.	conductivity
contg.	containing
cor.	corrected
CTAB	hexadecyltrimethylammonium bromide
cyclam	1,4,8,11-tetraazacyclotetradecane
detd.	determined
4,11-dieneN$_4$	5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene
d.k.	decay kinetics
dmg	dimethylglyoxime
DMSO	dimethyl sulfoxide
ε	extinction coefficient (molar absorptivity)
E_a	activation energy
EDTA	ethylenediaminetetraacetate
elec.	electrolysis, electrochemical method
e-r.	electron radiolysis
esr	electron spin resonance
estd.	estimated
Et	ethyl
EtOH	ethanol
formn.	formation
f.p.	flash photolysis
f.p./rq	flash photolysis/reductive quenching
f.p./oq	flash photolysis/oxidative quenching
γ-r.	gamma radiolysis
G	radiation yield (molecules per 100 eV)
$\Delta H^{\ddagger}$	activation enthalpy
I	ionic strength
J	joules (4.184 J=1 cal)
K	equilibrium constant
k	rate constant
k_f	rate constant of the forward reaction
k_r	rate constant of the reverse reaction
L	ligand
MB	methylene blue
meas.	measured
MeOH	methanol

MV^{2+}	methyl viologen (1,1′-dimethyl-4,4′- bipyridinium)
NTA	nitrilotriacetate
obs.	observed
opt.	optical absorption
Pa	pascals ($N\ m^{-2}$)
p.b.k.	product buildup kinetics
phen	1,10-phenanthroline
phot.	photolysis
pK_a	negative logarithm of the acid dissociation constant, where $AH+H_2O \rightleftarrows A^- + H_3O^+$
PNAP	*p*-nitroacetophenone
$PANBCo^{III}$	*p*-nitrobenzoato(pentaammine)cobalt(III) ion
p.r.	pulse radiolysis
prod.	product
PrOH	*propanol*
py	pyridine
Q	1,4-benzoquinone
redn.	reduction
rel.	relative
resp.	respectively
$\Delta S‡$	activation entropy
satd.	saturated
SDS	sodium dodecylsulfate
s.f.	stopped-flow
soln.	solution
TAN	2,2,6,6-tetramethyl-4-piperidone *N*-oxyl
TEOA	triethanolamine
TNM	tetranitromethane
TPPS	tetrakis(4-sulfonatophenyl)porphine
$\Delta V‡$	activation volume
X-r.	X-radiolysis

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TABLE 1. Methyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T(K)	Method	Comment	Ref.
1.1	**Methyl**						
	$^{\bullet}CH_3 + {}^{\bullet}CH_3 \rightarrow C_2H_6$	9×10^8	~7		p.r.	D.k. in N_2O-satd. soln. contg. 0.0014 mol L^{-1} CH_4; ε(215 nm) = 1500 L mol^{-1} cm^{-1}.	89G082
		1.6×10^9	4.4	298	p.r.	D.k. at 210-220 nm in soln. contg. 0.04 mol L^{-1} CH_4 (30 atm) and 2.5×10^{-3} mol L^{-1} N_2O; ε = 1600 and 975 L mol^{-1} cm^{-1} at 213 and 220 nm., resp.; E_a = 16 kJ mol^{-1}, studied at 280-340 K.	751055
		1.2×10^9	5.5		p.r.	D.k. in soln. contg. 0.01 mol L^{-1} CH_4 and 0.25 mol L^{-1} N_2O; ε = 850 L $mol^{-1}cm^{-1}$ at 220 nm.	720445
1.2	**Carbon monoxide**						
	$^{\bullet}CH_3 + CO \rightarrow CH_3\dot{C}O$	2.3×10^6			chem.	C.k. in CO-satd. soln. contg. $Co(cyclam)^{2+}$ and *tert*-butyl hydroperoxide; rel. to $k(^{\bullet}CH_3 + Co(cyclam)^{2+}) = 1.6 \times 10^7$ L mol^{-1} s^{-1}.	92A424
		1.8×10^6			chem.	C.k. in CO-satd. soln. contg. $Co(Me_6[14]aneN_4)^{2+}$ and *tert*-butyl hydroperoxide; rel. to $k(^{\bullet}CH_3 + Co(Me_6[14]aneN_4)^{2+}) = 4.2 \times 10^7$ L mol^{-1} s^{-1}.	92A424
		2.0×10^6	1-2	298	chem.	Estd. in soln contg. *tert*-butyl hydroperoxide and $Co(cyclam)^{2+}$ or $Co(Me_6[14]aneN_4)^{2+}$.	91M189
1.3	**Aqua(1,4,8,11-tetraazacyclotetradecane)cobalt(II) ion**						
	$^{\bullet}CH_3 + Co(cyclam)^{2+} \rightarrow CH_3Co(cyclam)^{2+}$	1.6×10^7	<2	297	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3Co(cyclam)^{2+}$ and $Co(cyclam)^{2+}$.	89A338
1.4	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanecobalt(II) ion**						
	$^{\bullet}CH_3 + Co(Me_6[14]aneN_4)^{2+} \rightarrow CH_3Co(Me_6[14]aneN_4)^{2+}$	4.2×10^7	7	296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3Co(cyclam)^{2+}$.	89A530
1.5	**2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(II) ion**						
	$^{\bullet}CH_3 + Co(Me_4tetraeneN_4)^{2+} \rightarrow CH_3Co(Me_4tetraeneN_4)^{2+}$	$\sim 5 \times 10^7$	1.3-7	296	f.p.	D.k. in soln. contg. $CH_3Co(cyclam)^{2+}$.	89A530
1.6	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**						
	$^{\bullet}CH_3 + N\text{-}rac\text{-}Co(4,11\text{-}dieneN_4)^{2+} \rightarrow N\text{-}rac\text{-}CH_3Co(4,11\text{-}dieneN_4)^{2+}$	6×10^7 $\sim 1 \times 10^8$	7	298 336	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} DMSO.	91A513
		7.3×10^7	1.3-7	296	f.p.	D.k. in soln. contg. $CH_3Co(cyclam)^{2+}$.	89A530
1.7	***N-meso*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**						
	$^{\bullet}CH_3 + N\text{-}meso\text{-}Co(4,11\text{-}dieneN_4)^{2+} \rightarrow N\text{-}meso\text{-}CH_3Co(4,11\text{-}dieneN_4)^{2+}$	2.3×10^8	1.3-7	296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3Co(cyclam)^{2+}$.	89A530
		$\sim 1.5 \times 10^8$	9.5		p.r.	D.k. at 330 nm (Co^{II}) as well as p.b.k. at 280 nm in Ar-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH and 5×10^{-3} mol L^{-1} CH_3I.	761203
		7×10^8	1		f.p.	Abs. changes in soln. contg. $Co(NH_3)_5(OAc)^{2+}$ and $HClO_4$.	74F644
1.8	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene(methyl)cobalt(III) ion**						
	$^{\bullet}CH_3 + N\text{-}rac\text{-}CH_3Co(4,11\text{-}dieneN_4)^{2+} \rightarrow C_2H_6 + N\text{-}rac\text{-}Co(4,11\text{-}dieneN_4)^{2+}$	4.1×10^7		296	f.p.	D.k. at 650 nm in deaerated soln. contg. $ABTS^{\bullet-}$ as indicator and $CH_3Co(4,11\text{-}dieneN_4)^{2+}$.	90A401
1.9	**(Acetato)pentaamminecobalt(III) ion**						
	$^{\bullet}CH_3 + Co(NH_3)_5(OAc)^{2+} \rightarrow$	4×10^3			phot.	Estd. from intensity dependence of CH_4 and C_2H_6 formn. in soln. contg. 0.005 mol L^{-1} $Co(NH_3)_5(OAc)^{2+}$ assuming $k(R + R) = 2 \times 10^{10}$ L mol^{-1} s^{-1}.	71F579
1.10	**Nitrilotriacetatocobaltate(II) ion**						
	$^{\bullet}CH_3 + CoNTA^- \rightarrow CH_3CoNTA^-$	4×10^7		293	p.r.	Abs. changes in N_2O-satd. soln. contg. DMSO.	94A367

TABLE 1. Methyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
1.10	**Nitrilotriacetatocobaltate(II) ion** — Continued						
		1.9×10^8	6.5		p.r.	P.b.k. at 264 nm in N_2O-satd. soln. contg. (1-5) × 10^{-3} mol L^{-1} $CoSO_4$, 6×10^{-3} mol L^{-1} NTA, 0.1 mol L^{-1} DMSO and 1.2×10^{-4} mol L^{-1} O_2; $\Delta V‡$ = 6.0 $cm^3\ mol^{-1}$, studied at 0.1 and 150 MPa.	91A443
		1.6×10^8	4.0-9.7		p.r.	P.b.k. at 320 nm in N_2O-satd. soln. contg. (5-100) × 10^{-5} mol L^{-1} $CoSO_4$, (1-5) × 10^{-3} mol L^{-1} NTA, and 0.2-1 mol L^{-1} DMSO.	88A343
1.11	**Bis(dimethylglyoximato)(pyridine)cobalt(II)**						
	$^{\bullet}CH_3 + Co(dmgH)_2py \rightarrow CH_3Co(dmgH)_2(py)$	$\sim 5 \times 10^7$			f.p.	D.k. following irrad.-induced Co-CH_3 homolysis of *pyridiniomethylbis(dimethylglyoximato)cobalt(III)*; back reaction.	777005
1.12	**3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion**						
	$^{\bullet}CH_3 + Co(tspc)^{4-} \rightarrow CH_3Co(tspc)^{4-}$	$>5 \times 10^9$	3-12		p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} DMSO.	89A150
1.13	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion**						
	$^{\bullet}CH_3 + CoTPPS^{4-} \rightarrow CH_3CoTPPS^{4-}$	1.5×10^9	13		p.r.	D.k. in N_2O-satd. soln. contg. CH_3I; methyl radical from DMSO gave $k = 1.2 \times 10^9$ L $mol^{-1}\ s^{-1}$; at pH 8 $k = 1.7 \times 10^9$ (CH_3I) and 1.4×10^9 L $mol^{-1}\ s^{-1}$ (DMSO).	83A088
1.14	**Cobal(II)amin**						
	$^{\bullet}CH_3 + B12r \rightarrow (CH_3)B12$	4.2×10^8	1.3-7	296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. $CH_3Co(cyclam)^{2+}$ and cobal(II)amin.	89A530
		4.4×10^8	7	296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3Co(cyclam)^{2+}$.	89A530
1.15	**Methyl(nitrilotriacetato)cobaltate(III) ion**						
	$^{\bullet}CH_3 + CH_3CoNTA^- \rightarrow CoNTA^- + C_2H_6$	3.8×10^7			p.r.	D.k. in N_2O-satd. soln. contg. $CoSO_4$, NTA and DMSO.	*89A204* 88A343
1.16	***Chromium(II) ion***						
	$^{\bullet}CH_3 + Cr^{2+} \rightarrow CrCH_3^{2+}$	2.2×10^8	~3	293	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and DMSO; $\Delta V‡ = 6.3\ cm^3\ mol^{-1}$, studied at 0.1-150 MPa.	92A361
		2.2×10^8	<2	297	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3Co(cyclam)^{2+}$.	89A338
1.17	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**						
	$^{\bullet}CH_3 + Cr([15]aneN_4)^{2+} \rightarrow CH_3Cr([15]aneN_4)^{2+}$	1.6×10^8		298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3Co(dmgH)_2$.	91A427
1.18	**Copper(I) ion**						
	$^{\bullet}CH_3 + Cu^+ \rightarrow CuCH_3^+$	3.5×10^9	0.7-5.0		p.r.	P.b.k. in N_2O-satd. soln. contg. (5-30) × 10^{-4} mol L^{-1} $CuSO_4$, (2-20) × 10^{-5} mol L^{-1} Cr^{3+}, (2-20) × 10^{-5} mol L^{-1} Cu^+ and 0.1-1.0 mol L^{-1} DMSO; Cu^+ prepared from $Cu^{2+} + Cr^{2+}$.	86A115
1.19	**Copper(II) ion**						
	$^{\bullet}CH_3 + Cu^{2+} \rightarrow CuCH_3^{2+}$	7.4×10^5	~2		f.p.	P.b.k. in soln. contg. 0.01 mol L^{-1} $HClO_4$, 0.01-0.2 mol L^{-1} Cu^{2+} and $Co(NH_3)_5(OAc)^{2+}$.	78F301
1.20	***cis*-Diaqua(nitrilotriacetato)copper(II) ion**						
	$^{\bullet}CH_3 + cis\text{-}[Cu(NTA)(H_2O)_2]^- \rightarrow cis\text{-}[CH_3Cu(NTA)(H_2O)]^-$	3.5×10^7	5-8		p.r.	P.b.k. in N_2O-satd. soln. contg. $CuSO_4$, nitrilotriacetate ion and DMSO.	86B151

TABLE 1. Methyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
1.21	**Bis(glycinato)methylcopper(III) ion**						
	$^{\bullet}CH_3 + (Gly)_2CuCH_3 \rightarrow Cu(Gly)_2 + C_2H_6$	$>5 \times 10^9$			γ-r.	Estd. from yield of ethane in low-dose experiments.	90A421
1.22	**Nitrilotriacetatoferrate(II) ion**						
	$^{\bullet}CH_3 + FeNTA^- \rightarrow CH_3FeNTA^-$	1×10^7		293	p.r.	Abs. changes in N_2O-satd. soln. contg. DMSO; $\Delta V‡ = -0.3\ cm^3\ mol^{-1}$, P range not given.	94A367
		2.1×10^7 5.3×10^6	4.0-8.0 10.5		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.002-0.006 mol L^{-1} NTA, $(0.05\text{-}5.0) \times 10^{-3}$ mol L^{-1} $FeSO_4$ and 0.1-0.5 mol L^{-1} DMSO; $k_r = 9 \times 10^3$ and 1×10^3 s^{-1} at pH 4-8 and 10.5, resp.	88A426
1.23	**Iron(II) deuteroporphyrin IX**						
	$^{\bullet}CH_3 + Fe(II)DP \rightarrow$ addn.	3.9×10^9	7		p.r.	Abs. changes in soln. contg. deuterohemin, chemically reduced by dithionite, and methyl chloride.	81A123
1.24	**(Methyl)nitrilotriacetatoferrate(III) ion**						
	$^{\bullet}CH_3 + CH_3FeNTA^- \rightarrow C_2H_6 + FeNTA^-$	5.5×10^8 $\sim 2 \times 10^7$	4.0-8.0 10.5		p.r.	D.k. in N_2O-satd. soln. contg. 0.002-0.006 mol L^{-1} NTA, $(0.05\text{-}5.0) \times 10^{-3}$ mol L^{-1} $FeSO_4$ and 0.1-0.5 mol L^{-1} DMSO; second-order kinetics.	88A426
1.25	**Tris(1,10-phenanthroline)iron(III) ion**						
	$^{\bullet}CH_3 + Fe(phen)_3^{3+} \rightarrow$ redn.	$\sim 3 \times 10^8$	~1		p.r.	P.b.k. at 490 nm in soln. contg. CH_3Br; result unaffected by presence of *tert*-BuOH, therefore $^{\bullet}CH_2Br$ must react much more slowly; probably *inner-sphere mechanism.*	85A284
1.26	**Ferricyanide ion**						
	$^{\bullet}CH_3 + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-}$ + other prod.	5×10^6	4-6	295	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. DMSO.	82A041
1.27	**Iron(III) deuteroporphyrin IX**						
	$^{\bullet}CH_3 + Fe(III)DP \rightarrow$ addn.	2.3×10^9 $\sim 1.3 \times 10^9$	~13 7		p.r.	Abs. changes in soln. contg. 6.5 mol L^{-1} 2-PrOH and 4.1×10^{-3} mol L^{-1} methyl iodide.	81A123
1.28	**Iodine**						
	$^{\bullet}CH_3 + I_2 \rightarrow [CH_3I_2]^{\bullet}$	6.0×10^9			p.r.	C.k. in soln. contg. MeI; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	670041
1.29	**Hexachloroiridate(IV) ion**						
	$^{\bullet}CH_3 + IrCl_6^{2-} \rightarrow CH_3Cl + IrCl_5^{2-}$	1.2×10^9	4-6	295	p.r.	D.k. at 490 nm in N_2O-satd. soln.; radical from DMSO.	82A041
1.30	**Aquanitrilotriacetatomanganate(II) ion**						
	$^{\bullet}CH_3 + MnNTA^- \rightarrow CH_3MnNTA^-$	1.5×10^8	4.0-8.0		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.002-0.006 mol L^{-1} NTA, $(0.05\text{-}5.0) \times 10^{-3}$ mol L^{-1} $MnSO_4$ and 0.1-0.5 mol L^{-1} DMSO; $k_r = 1.2 \times 10^5$ s^{-1} L mol^{-1} s^{-1}.	88A426
1.31	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(II) ion**						
	$^{\bullet}CH_3 + MnTPPS^{4-} \rightarrow CH_3MnTPPS^{4-}$	9.7×10^8	8.8	295	p.r.	P.b.k. of Mn(III)TPPS in N_2O-satd. soln. contg. DMSO. Mechanism of oxidation suggested to involve addn. of CH_3 to Mn.	92A391
1.32	**(Methyl)nitrilotriacetatoferrate(III) ion**						
	$^{\bullet}CH_3 + CH_3MnNTA^- \rightarrow C_2H_6 + MnNTA^-$	1.6×10^9	4.0-8.0		p.r.	Calcd. from concn. dependence of d.k. in N_2O-satd. soln. contg. 0.002-0.006 mol L^{-1} NTA, $(0.05\text{-}5.0) \times 10^{-3}$ mol L^{-1} $MnSO_4$ and 0.1-0.5 mol L^{-1} DMSO; second-order kinetics.	88A426

TABLE 1. Methyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
1.33	**Permanganate ion**						
	$^{\bullet}CH_3 + MnO_4^- \rightarrow$	1.1×10^9	4-6	295	p.r.	D.k. at 545 nm in N_2O-satd. soln.; radical from DMSO.	82A041
1.34	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**						
	$^{\bullet}CH_3$ + α-Ni(cyclam)$^{2+}$ → α-CH_3Ni(cyclam)$^{2+}$	1.1×10^9	0	298	f.p.	D.k. at 650 nm in deaerated soln. contg. $ABTS^{\bullet-}$ as indicator and $CH_3Co(4,11\text{-dieneN}_4)^{2+}$.	91A515
			3		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} DMSO and 0.001 mol L^{-1} Ni(cyclam)$^{2+}$; $\Delta V^{\ddagger} = -4.0\ cm^3\ mol^{-1}$, studied at 5-150 MPa.	90A321
		6.5×10^8	3-10		p.r.	P.b.k. at 300-360 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} DMSO and $(1\text{-}10) \times 10^{-4}$ mol L^{-1} Ni(cyclam)$^{2+}$; $k_r = 57\ s^{-1}$.	88A444
1.35	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**						
	$^{\bullet}CH_3$ + β-Ni(cyclam)$^{2+}$ + H_2O → β-CH_3Ni(cyclam)$^{2+}$	7.3×10^8	0	298	f.p.	D.k. at 650 nm in deaerated soln. contg. $ABTS^{\bullet-}$ as indicator and alkylcobalt(III) complex.	91A515
1.36	**α-Aquamethyl(1,4,8,11-tetraazacyclotetradecane)nickel(III) ion**						
	$^{\bullet}CH_3$ + α-CH_3Ni(cyclam)$^{2+}$ → C_2H_6 + α-Ni(cyclam)$^{2+}$	4×10^7	3-10		p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} DMSO and $(1\text{-}10) \times 10^{-4}$ mol L^{-1} Ni(cyclam)$^{2+}$; $k_r = 57\ s^{-1}$.	88A444
1.37	**Hydrogen peroxide**						
	$^{\bullet}CH_3 + H_2O_2 \rightarrow$	$\leq 10^6$			p.r.	Addn. of 10^{-3} and 10^{-2} mol L^{-1} H_2O_2 had no effect on second order d.k. of $^{\bullet}CH_3$. Suggested that reaction is slow compared to R + R and may form HO_2.	751055
1.38	**Oxygen**						
	$^{\bullet}CH_3 + O_2 \rightarrow CH_3OO^{\bullet}$	4.1×10^9	1	298	f.p.	D.k. at 650 nm in deaerated soln. contg. $ABTS^{\bullet-}$ as indicator and 0.1 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2OH_2$ or $RCo(cyclam)H_2O^{2+}$.	91A176
		4.1×10^9	0	298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2OH_2$ or $RCo(cyclam)H_2O^{2+}$; rel. to $k(^{\bullet}CH_3 + Ni(cyclam)^{2+}) = 6.5 \times 10^8\ L\ mol^{-1}\ s^{-1}$.	91A176
		3×10^9	6.2-6.5		p.r.	Calcd. from increase in abs. at 310 nm due to formn. of $NTACoOOCH_3^-$ in N_2O-satd. soln. contg. DMSO, 5×10^{-5} mol L^{-1} O_2 and varied [$CoNTA^-$] or N_2O-satd soln. contg. DMSO, 0.001 mol L^{-1} $CoNTA^-$ and varied [O_2].	89A204
		3.7×10^9	3		p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.1 mol L^{-1} DMSO, 1×10^{-3} mol L^{-1} $HClO_4$ and Ni(cyclam)$^{2+}$; rel. to $k(^{\bullet}CH_3 + Ni(cyclam)^{2+}) = 6.5 \times 10^8\ L\ mol^{-1}\ s^{-1}$.	88A444
		4.7×10^9		296	p.r.	P.b.k. at 260 nm in soln. contg. CH_3Br, O_2 and SCN^-; $E_a = 14.6\ kJ\ mol^{-1}$.	670041
1.39	**Hydrogen peroxomonosulfate ion**						
	$^{\bullet}CH_3 + HSO_5^- \rightarrow$	1.2×10^5			chem.	Esr study in soln. contg. Ti(III) sulfate, H_2O_2, HSO_5^- and DMSO.	90D226
1.40	**Peroxodisulfate ion**						
	$^{\bullet}CH_3 + S_2O_8^{2-} \rightarrow SO_4^{\bullet-} + SO_4^{2-}$ + other prod.	3.3×10^4		~293	chem.	Esr study in soln. contg. 0.008 mol L^{-1} Ti(III), 0.01 mol L^{-1} H_2O_2, (0-0.025) mol L^{-1} $S_2O_8^{2-}$ and ~0.01 mol L^{-1} DMSO.	84D044
1.41	**Uranium(III) ion**						
	$^{\bullet}CH_3 + U^{3+} \rightarrow UCH_3^{3+}$	1.5×10^9	0.3		p.r.	D.k. at 355 nm in He-satd. soln. contg. 0.5 mol L^{-1} $HClO_4$ and 0.1 mol L^{-1} DMSO.	85A122

TABLE 1. Methyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
1.42	**Vanadium(II) ion**						
	$^{\bullet}CH_3 + V^{2+} + H^+ \rightarrow CH_4 + V^{3+}$	6.2×10^5	2	296	f.p.	D.k. at 600 nm using $MV^{\bullet+}$ as indicator in soln. contg. 0.01-0.03 mol L^{-1} H^+, (1-5) $\times$ 10^{-4} mol L^{-1} $CH_3Co(dmgH)_2$ or $CH_3Co(cyclam)^{2+}$, (5-60) $\times$ 10^{-6} mol L^{-1} $MV^{\bullet+}$, and 0.01-0.06 mol L^{-1} V^{2+}; k = 2.1×10^5 L mol^{-1} s^{-1} in D_2O.	91A428
1.43	**Acetic acid**						
	$^{\bullet}CH_3 + CH_3CO_2H \rightarrow CH_4 + {}^{\bullet}CH_2CO_2H$	6×10^2			phot.	C.k. in soln. contg. 0.3 mol L^{-1} AcOH and 0.5 mol L^{-1} $Na_2S_2O_8$; assuming $2k$ for radical termination = 1.8×10^9 L mol^{-1} s^{-1}.	85D168
		2×10^2	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.44	**Acetone**						
	$^{\bullet}CH_3 + CH_3COCH_3 \rightarrow CH_4 + CH_3C\dot{O}CH_2$	$\sim 1 \times 10^3$			phot.	Obs. yields of CH_4 and C_2H_6; rel. to $k(^{\bullet}CH_3 + {}^{\bullet}CH_3) = 1.4 \times 10^9$ L mol^{-1} s^{-1}.	697176
		$\sim 1 \times 10^3$			phot.	Estd. from quantum yields of CH_4, CO, and C_2H_6; rel. to $k(^{\bullet}CH_3 + {}^{\bullet}CH_3) = 1.4 \times 10^9$ L mol^{-1} s^{-1}.	60F004
1.45	**Acetonitrile**						
	$^{\bullet}CH_3 + CH_3CN \rightarrow CH_4 + {}^{\bullet}CH_2CN$	$< 3 \times 10^2$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.46	**Acrylate ion**						
	$^{\bullet}CH_3 + CH_2{=}CHCO_2^- \rightarrow$ addn.	7×10^5	~9		chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and DMSO; calcd. using $2k(R + R) = 2.5 \times 10^9$ L mol^{-1} s^{-1}.	93D265
1.47	**Acrylic acid**						
	$^{\bullet}CH_3 + H_2C{=}CHCO_2H \rightarrow$ addn.	3.0×10^6	~2		chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and DMSO; calcd. using $2k(R + R) = 2.5 \times 10^9$ L mol^{-1} s^{-1}.	93D265
1.48	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**						
	$^{\bullet}CH_3 + ABTS^{\bullet-} \rightarrow$ addn.	1.2×10^9	0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$) and alkylcobalt(III) complex.	91A515
1.49	**1,4-Benzoquinone**						
	$^{\bullet}CH_3 + Q \rightarrow$ addn.	4.5×10^7	5.4		p.r.	P.b.k. at 430 nm as well as condy. changes in N_2O-satd. soln. contg. 0.2 mol L^{-1} DMSO; mechanism suggested to involve addn.	82A284
1.50	**Butadiene**						
	$^{\bullet}CH_3 + H_2C{=}CHCH{=}CH_2 \rightarrow$ addn.	1.2×10^6			γ-r.	C.k. with MeOH in soln. contg. MeI; obs. $G(CH_4)$; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	670041
1.51	**1-Butene**						
	$^{\bullet}CH_3 + CH_3CH_2CH{=}CH_2 \rightarrow$ addn.	3.0×10^4			γ-r.	C.k. with MeOH in soln. contg. MeI; obs. $G(CH_4)$; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	670041
1.52	**3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy**						
	$^{\bullet}CH_3$ + NX-s →	7.5×10^8	3.0		p.r.	Condy. changes in N_2O-satd. soln. contg. 10^{-2}-10^{-1} mol L^{-1} DMSO; addn. reaction.	761152
1.53	**3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy**						
	$^{\bullet}CH_3$ + NX-u →	7.8×10^8	acid.		p.r.	Condy. changes in N_2O-satd. soln. contg. 10^{-2}-10^{-1} mol L^{-1} DMSO; addn. reaction.	761152

TABLE 1. Methyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	T(K)	Method	Comment	Ref.
1.54	**Chloroacetic acid**						
	$^{\bullet}CH_3 + ClCH_2CO_2H \rightarrow CH_4 + {}^{\bullet}CHClCO_2H$	3.0×10^3	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.55	**Crotonic acid**						
	$^{\bullet}CH_3 + CH_3CH{=}CHCO_2H \rightarrow$ addn.	1×10^5	~2		chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and DMSO; calcd. using $2k$(R + R) = 2.5×10^9 L mol^{-1} s^{-1}.	93D265
1.56	**Cyanoacetic acid**						
	$^{\bullet}CH_3 + NCCH_2CO_2H \rightarrow CH_4 + NCCHCO_2H$	$>6.6 \times 10^3$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.57	**Cysteine**						
	$^{\bullet}CH_3 + CysSH \rightarrow CH_4 + CysS^{\bullet}$	7.4×10^7	7.0	~298	f.p.	P.b.k. at 650 nm using $ABTS^{\bullet-}$ as indicator in soln. contg. $ABTS^{2-}$ and $CH_3Co(cyclam)^{2+}$.	92A401 92A223
1.58	**Deuteroporphyrin, dimethyl ester**						
	$^{\bullet}CH_3 + DPDME \rightarrow$	~1.5×10^7	~13		p.r.	Estd. from abs. changes in soln. contg. 6.5 mol L^{-1} 2-PrOH, 0.7 mol L^{-1} acetone and 2.3×10^{-2} mol L^{-1} CII_3I; cor. for $^{\bullet}CII_3 + {}^{\bullet}CII_3$.	81A123
1.59	**1,6-Diazabicyclo[4.4.4]tetradecane radical cation**						
	$^{\bullet}CH_3 + DABCT^{\bullet+} \rightarrow$ H abstr.	1.6×10^9	~4		p.r.	D.k. in N_2O-satd. soln. contg. 0.5 mol DMSO and (0.2-10) $\times 10^{-4}$ mol L^{-1} radical cation.	86A272
1.60	**3,5-Dibromo-4-nitrosobenzenesulfonate ion**						
	$^{\bullet}CH_3 + DBNBS \rightarrow DBNBS\text{-}CH_3$	1.6×10^9	8.0-8.5		p.r.	C.k. rel. to $k(^{\bullet}CH_3 + H_2TPPS^{4-}) = 3.2 \times 10^{10}$ L mol^{-1} s^{-1}.	92A304
		2.8×10^9	8.0-8.5		p.r.	C.k.; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	92A304
1.61	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**						
	$^{\bullet}CH_3 + MV^{\bullet+} \rightarrow CH_3MV^+$	1.5×10^9		298	f.p.	D.k. at 600 nm in soln. contg. $CH_3Co(dmgH)_2$.	91A427
		1.5×10^9	2	296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^+, (1-5) $\times$ 10^{-4} mol L^{-1} $CH_3Co(dmgH)_2$ or $CH_3Co(cyclam)^{2+}$, (5-38) $\times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$; k = 1.3×10^9 L mol^{-1} s^{-1} in D_2O.	91A428
		1.2×10^9	<2	297	f.p.	D.k. at 600 nm ($MV^{\bullet+}$, $\varepsilon = 1.37 \times 10^4$ L mol^{-1} cm^{-1}, 0.01-0.1 mol L^{-1}); $MV^{\bullet+}$ from Zn/Hg redn. of MV^{2+}; (2-4) $\times 10^{-6}$ mol L^{-1} radical from photolysis of $CH_3Co(cyclam)^{2+}$.	89A338
1.62	**Ergothioneine**						
	$^{\bullet}CH_3 + ETH \rightarrow$	$<10^5$	7.0	293	p.r.	Abs. changes in soln. contg. DMSO; no reaction obs.	89R263
1.63	**Ethanethiol**						
	$^{\bullet}CH_3 + C_2H_5SH \rightarrow CH_4 + C_2H_5S^{\bullet}$	4.0×10^7 4.7×10^7	1.0 7.0	298	f.p.	P.b.k. at 650 nm using $ABTS^{\bullet-}$ as indicator in soln. contg. $ABTS^{2-}$ and $CH_3Co(cyclam)^{2+}$.	92A401 92A223
1.64	**Ethanol**						
	$^{\bullet}CH_3 + EtOH \rightarrow CH_4 + CH_3\dot{C}HOH$	5.9×10^2			γ-r.	C.k. in soln. contg. MeI; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	670041
1.65	**Ethyl acetate**						
	$^{\bullet}CH_3 + CH_3CO_2C_2H_5 \rightarrow CH_4 + CH_3CO_2\dot{C}HCH_3$	$<1.7 \times 10^3$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188

TABLE 1. Methyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
1.66	**Ethylene**						
	$^{\bullet}CH_3 + H_2C{=}CH_2 \rightarrow {}^{\bullet}CH_2CH_2CH_3$	4.9×10^3			γ-r.	C.k. with 2-PrOH in soln. contg. MeI; obs. $G(CH_4)$; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	670041
1.67	**Glutathione**						
	$^{\bullet}CH_3 + GSH \rightarrow CH_4 + GS^{\bullet}$	7.1×10^7	7.0	~298	f.p.	P.b.k. at 650 nm using $ABTS^{\bullet-}$ as indicator in soln. contg. $ABTS^{2-}$ and $CH_3Co(cyclam)^{2+}$.	92A401 92A223
		5×10^7	7.0	293	p.r.	Abs. changes in soln. contg. DMSO.	89R263
1.68	**Glutathione, negative ion**						
	$^{\bullet}CH_3 + GS^- \rightarrow$	$<10^6$	12.5	293	p.r.	Abs. changes in soln. contg. DMSO; no reaction obs.	89R263
1.69	**Glycine**						
	$^{\bullet}CH_3 + GlyH \rightarrow$	~4			phot.	Calcd. from yields of CH_4 and C_2H_6; assumed $2k(R + R) = 2 \times 10^9$ L mol^{-1} s^{-1}; $^{\bullet}CH_3$ from cumene hydroperoxide; $k_H/k_D = 10.5$ at pH 11.5 [747528].	707280
1.70	**Glycine, negative ion**						
	$^{\bullet}CH_3 + Gly^- \rightarrow CH_4 + H_2N\dot{C}HCO_2^-$	$\sim 1.2 \times 10^2$	~10		phot.	Calcd. from yields of CH_4 and C_2H_6; assumed $2k(R + R) = 2 \times 10^9$ L mol^{-1} s^{-1}; $^{\bullet}CH_3$ from cumene hydroperoxide.	707280
1.71	**Glycolic acid**						
	$^{\bullet}CH_3 + HOCH_2CO_2H \rightarrow CH_4 + {}^{\bullet}CHOHCO_2H$	3.6×10^3	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.72	**3-Hydroxypropionitrile**						
	$^{\bullet}CH_3 + HOCH_2CH_2CN \rightarrow CH_4 + {}^{\bullet}CHOHCH_2CH_2CN$	$<1.6 \times 10^3$	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.73	**Lactic acid**						
	$^{\bullet}CH_3 + CH_3CH(OH)CO_2H \rightarrow CH_4 + CH_3\dot{C}OHCO_2H$	1.2×10^4	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.74	**2-Mercapto-1-methylimidazole**						
	$^{\bullet}CH_3 + MMI \rightarrow$	$<10^6$	7.0, 12.5	293	p.r.	Abs. changes in soln. contg. DMSO; no reaction obs.	89R263
1.75	**Methacrylic acid**						
	$^{\bullet}CH_3 + H_2C{=}C(CH_3)CO_2H \rightarrow$ addn.	5.8×10^6	~2		chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and DMSO; calcd. using $2k(R + R) = 2.5 \times 10^9$ L mol^{-1} s^{-1}.	93D265
1.76	**Methanethiol**						
	$^{\bullet}CH_3 + CH_3SH \rightarrow CH_4 + CH_3S^{\bullet}$	7.4×10^7	11		p.r.	P.b.k. ($RSSR^{\bullet-}$) in Ar-satd. soln.; radical from e_{aq}^- reaction with CH_3SH.	690553
1.77	**Methanol**						
	$^{\bullet}CH_3 + MeOH \rightarrow CH_4 + {}^{\bullet}CH_2OH$	$\geq 1 \times 10^2$	1		phot.	Estd. from effect of addn. of MeOH on CH_4 and C_2H_6 yields. Radical from $Co(NH_3)_5O_2CCH_3^{2+}$.	71F579
		2.2×10^2			γ-r.	C.k. in soln. contg. MeI; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	670041
1.78	**4-Methoxybenzenethiol**						
	$^{\bullet}CH_3 + 4\text{-}CH_3OC_6H_4SH \rightarrow CH_4 + 4\text{-}CH_3OC_6H_4S^{\bullet}$	1.3×10^8	3.0	293	p.r.	Abs. changes in soln. contg. DMSO.	89R263

TABLE 1. Methyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
1.79	**4-Methoxybenzenethiolate ion**						
	$^{\bullet}CH_3 + 4\text{-}CH_3OC_6H_4S^- \rightarrow$	$<10^5$	9.0	293	p.r.	Abs. changes in soln. contg. DMSO; no reaction obs.	89R263
1.80	**2-Methyl-2-nitrosopropane**						
	$^{\bullet}CH_3 + (CH_3)_3CNO \rightarrow$ addn.	1.7×10^7	~7	~291	p.r.	P.b.k. (esr) in unbuffered N_2O-satd. soln. contg. 1.0 mol L^{-1} DMSO and $(0.25\text{-}15) \times 10^{-3}$ mol L^{-1} MNP (assuming complete dimer dissociation).	91D097
1.81	**2-Methylpropene**						
	$^{\bullet}CH_3 + CH_2{=}C(CH_3)_2 \rightarrow$ addn.	3.9×10^4			γ-r.	C.k. with MeOH in soln. contg. MeI; obs. $G(CH_4)$; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	670041
1.82	**Methyl propionate**						
	$^{\bullet}CH_3 + C_2H_5CO_2CH_3 \rightarrow CH_4 + CH_3\dot{C}HCO_2CH_3$	2.9×10^3	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.83	**2-Methylpropionic acid**						
	$^{\bullet}CH_3 + (CH_3)_2CHCO_2H \rightarrow CH_4 + {}^{\bullet}C(CH_3)_2CO_2H$	9.0×10^3	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.84	**2-Methylpropionitrile**						
	$^{\bullet}CH_3 + (CH_3)_2CHCN \rightarrow CH_4 + {}^{\bullet}C(CH_3)_2CN$	4.5×10^3	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.85	***aci*-Nitroethane, negative ion**						
	$^{\bullet}CH_3 + CH_3CH{=}NO_2^- \rightarrow (CH_3)_2CHNO_2^{\bullet-}$	1.6×10^7	10.6		p.r.	P.b.k. at 270 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} DMSO and 5×10^{-4} mol L^{-1} nitroalkane.	82A283
1.86	***aci*-Nitromethane anion**						
	$^{\bullet}CH_3 + CH_2NO_2^- \rightarrow CH_3CH_2NO_2^{\bullet-}$	1.0×10^8	11.3	~285	p.r.	P.b.k. (esr) in N_2O-satd. soln. contg. $(0.5\text{-}5) \times 10^{-3}$ mol L^{-1} nitromethane and 0.5 mol L^{-1} DMSO.	*88D069*
		1.4×10^8	11.1		p.r.	P.b.k. at 270 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} DMSO and 5×10^{-4} mol L^{-1} nitroalkane.	82A283
1.87	***aci*-1-Nitropropane, negative ion**						
	$^{\bullet}CH_3 + CH_3CH_2CH{=}NO_2^- \rightarrow CH_3CH_2CH(CH_3)NO_2^{\bullet-}$	1.4×10^7	10.7		p.r.	P.b.k. at 270 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} DMSO and 5×10^{-4} mol L^{-1} nitroalkane.	82A283
1.88	***aci*-2-Nitropropane, negative ion**						
	$^{\bullet}CH_3 + (CH_3)_2C{=}NO_2^- \rightarrow (CH_3)_3CNO_2^{\bullet-}$	2.4×10^6	10.7		p.r.	P.b.k. at 270 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} DMSO and 5×10^{-4} mol L^{-1} nitroalkane.	82A283
1.89	**3-Pentanone**						
	$^{\bullet}CH_3 + C_2H_5COC_2H_5 \rightarrow CH_4 + CH_3\dot{C}HCOC_2H_5$	1.4×10^4	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.90	**2-Propanol**						
	$^{\bullet}CH_3 + 2\text{-PrOH} \rightarrow CH_4 + (CH_3)_2\dot{C}OH$	$\geq 1.6 \times 10^3$	1		phot.	Estd. from effect of addn. of 2-PrOH on CH_4 and C_2H_6 yields in photolysis of $Co(NH_3)_5O_2CCH_3^{2+}$.	71F579
		3.4×10^3			γ-r.	C.k. in soln. contg. MeI; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	670041
1.91	**Propionic acid**						
	$^{\bullet}CH_3 + C_2H_5CO_2H \rightarrow CH_4 + CH_3\dot{C}HCO_2H$	3.0×10^3	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188
1.92	**Propionitrile**						
	$^{\bullet}CH_3 + C_2H_5CN \rightarrow CH_4 + CH_3\dot{C}HCN$	1.2×10^3	~1		chem.	Estd. from esr meas. and values for competing reactions. Radical from DMSO in Ti^{III}-H_2O_2 soln.	755188

TABLE 1. Methyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
1.93	**Propylene**						
	$^{\bullet}CH_3 + CH_3CH{=}CH_2 \rightarrow$ addn.	5.3×10^3			γ-r.	C.k. with 2-PrOH in soln. contg. MeI; obs. $G(CH_4)$; rel. to $k(^{\bullet}CH_3 + O_2) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	670041
1.94	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine**						
	$^{\bullet}CH_3 + H_2TPPS^{4-} \rightarrow$	3.2×10^{10}	8.0-8.5		p.r.	No experimental details given. Value appears too high.	92A304
1.95	**Deoxyribonucleic acid**						
	$^{\bullet}CH_3$ + DNA $\rightarrow$	8.8×10^4	7		γ-r.	C.k. in soln. contg. DMSO; estd. from effect of [DMSO] and [DNA] on single-strand breaks; rel. to $k(^{\bullet}CH_3 + O_2) = 5 \times 10^9$ L mol^{-1} s^{-1}.	94R034

TABLE 2. Ethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
2.1	**Ethyl**						
	$^{\bullet}CH_2CH_3 + {}^{\bullet}CH_2CH_3 \rightarrow n\text{-}C_4H_{10}$	7×10^8	~7		p.r.	D.k. in N_2O-satd. soln. contg. 0.0019 mol L^{-1} ethane; $\varepsilon(204\ nm) = 980\ L\ mol^{-1}\ cm^{-1}$.	89G082
		1.2×10^9	4.4	298	p.r.	D.k. in soln. contg. 0.05 mol L^{-1} ethane (30 atm) and 2.5×10^{-3} mol L^{-1} N_2O; ε = 790, 750, 700, 545 and 375 L $mol^{-1}cm^{-1}$ at 210, 215, 220, 230 and 250 nm, resp.; E_a = 16 kJ mol^{-1}, studied at 278-341 K.	751055
		9.6×10^6	5.5		p.r.	D.k. in soln. contg. 10^{-2} mol L^{-1} ethane and 10^{-3} mol L^{-1} N_2O; ε = 520 and 330 L mol^{-1} cm^{-1} at 220 and 250 nm, resp.	720445
2.2	**Diaqua(1,4,8,11-tetraazacyclotetradecane)cobalt(II) ion**						
	$^{\bullet}CH_2CH_3 + Co(cyclam)^{2+} \rightarrow C_2H_5Co(cyclam)^{2+}$	1.1×10^7	<2	297	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3CH_2Co(cyclam)^{2+}$ and $Co(cyclam)^{2+}$.	89A338
2.3	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanecobalt(II) ion**						
	$^{\bullet}CH_2CH_3 + Co(Me_6[14]aneN_4)^{2+} \rightarrow CH_3CH_2Co(Me_6[14]aneN_4)^{2+}$	2.9×10^7	1.7-7	296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3CH_2Co(cyclam)^{2+}$.	89A530
2.4	**Cobal(II)amin**						
	$^{\bullet}CH_2CH_3 + B12r \rightarrow (CH_3CH_2)B12$	5.1×10^8	7	296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. $CH_3CH_2Co(cyclam)^{2+}$ and cobal(II)amin.	89A530
2.5	**Pentaammine(aqua)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(NH_3)_5^{3+} \rightarrow EtOH + Co(NH_3)_5^{2+} + H^+$	$<2 \times 10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.6	**Pentaammine(bromo)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(NH_3)_5Br^{2+} \rightarrow C_2H_5Br + Co(NH_3)_5^{2+}$	3.0×10^6	~1	296	f.p.	C.k. in deaerated soln. contg. $C_2H_5Co(dmgH)_2OH_2$, assuming $k(^{\bullet}CH_2CH_3 + {}^{\bullet}CH_2CH_3) = 1.2 \times 10^9$; rel. to $k(^{\bullet}CH_2CH_3 + IrCl_6^{2-}) = 2.8 \times 10^9$ L mol^{-1} s^{-1}.	90A403
		2.6×10^6	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.7	**Pentaammine(chloro)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(NH_3)_5Cl^{2+} \rightarrow C_2H_5Cl + Co(NH_3)_5^{2+}$	$<3 \times 10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.8	**Pentaammine(fluoro)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(NH_3)_5F^{2+} \rightarrow CH_3CH_2F + Co(NH_3)_5^{2+}$	$<2 \times 10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.9	**Pentaammine(azido)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(NH_3)_5(N_3)^{2+} \rightarrow CH_3CH_2N_3 + Co(NH_3)_5^{2+}$	3.7×10^7	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.10	**Pentaammine(thiocyanato-*N*)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(NH_3)_5(NCS)^{2+} \rightarrow C_2H_5NCS + Co(NH_3)_5^{2+}$	$<2 \times 10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.11	**Pentaammine(thiocyanato-*S*)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(NH_3)_5SCN^{2+} \rightarrow C_2H_5SCN + Co(NH_3)_5^{2+}$	1.4×10^7	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.12	**Pentaammine(cyano)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(NH_3)_5(CN)^{2+} \rightarrow C_2H_5CN + Co(NH_3)_5^{2+}$	$<4 \times 10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403

TABLE 2. Ethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
2.13	***cis*-Aquachlorobis(ethylenediamine)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + cis\text{-}Co(en)_2(H_2O)Cl^{2+} \rightarrow C_2H_5Cl + cis\text{-}Co(en)_2(H_2O)^{2+}$	$<3\times10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.14	***trans*-Dichlorobis(ethylenediamine)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + trans\text{-}Co(en)_2Cl_2^{+} \rightarrow C_2H_5Cl + trans\text{-}Co(en)_2Cl^{+}$	$\sim6\times10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.15	***cis*-Dichlorobis(ethylenediamine)cobalt(III) ion**						
	$^{\bullet}CH_2CH_3 + cis\text{-}Co(en)_2Cl_2^{+} \rightarrow C_2H_5Cl + cis\text{-}Co(en)_2Cl^{+}$	$<2\times10^5$	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.16	**Aquachlorobis(dimethylglyoximato)cobalt(III)**						
	$^{\bullet}CH_2CH_3 + ClCo(dmgH)_2 \rightarrow C_2H_5Cl + Co(dmgH)_2$	2.3×10^6	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.17	**Dibromobis(dimethylglyoximato)cobaltate(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(dmgH)_2Br_2^{-} \rightarrow C_2H_5Br + Co(dmgH)_2Br^{-}$	5.3×10^8	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.18	**Dichlorobis(dimethylglyoximato)cobaltate(III) ion**						
	$^{\bullet}CH_2CH_3 + Co(dmgH)_2Cl_2^{-} \rightarrow C_2H_5Cl + Co(dmgH)_2Cl^{-}$	1.1×10^7	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.19	**Acetonitrile(bromo)bis(dimethylglyoximato)cobalt(III)**						
	$^{\bullet}CH_2CH_3 + BrCo(dmgH)_2NCCH_3 \rightarrow C_2H_5Br + Co(dmgH)_2NCCH_3$	1.6×10^8	~1	296	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and $C_2H_5Co(dmgH)_2$.	90A403
2.20	**Chromium(II) ion**						
	$^{\bullet}CH_2CH_3 + Cr^{2+} \rightarrow CrCH_2CH_3^{2+}$	1.9×10^8	<2	297	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3CH_2Co(cyclam)^{2+}$.	89A338
2.21	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**						
	$^{\bullet}CH_2CH_3 + Cr([15]aneN_4)^{2+} \rightarrow CH_3CH_2Cr([15]aneN_4)^{2+}$	1×10^8		298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $CH_3CH_2Co(dmgH)_2$.	91A427
2.22	**Tris(2,2'-bipyridine)chromium(III) ion**						
	$^{\bullet}CH_2CH_3 + Cr(bpy)_3^{3+} \rightarrow$	1.8×10^7		296	f.p.	D.k. in deaerated soln. contg. $C_2H_5Co(dmgH)_2OH_2$, assuming $k(^{\bullet}CH_2CH_3 + {}^{\bullet}CH_2CH_3) = 1.2\times10^9$. Product obs. at 560 nm suggested to be ring addn.	90A403
2.23	**Tris(2,2'-bipyridine)iron(III) ion**						
	$^{\bullet}CH_2CH_3 + Fe(bpy)_3^{3+} \rightarrow H_2C{=}CH_2 + Fe(bpy)_3^{2+} + H^+$	9.2×10^8	~1	296	f.p.	D.k. in deaerated soln. contg. $C_2H_5Co([14]aneN_4)^{2+}$ assuming $k(^{\bullet}CH_2CH_3 + {}^{\bullet}CH_2CH_3) = 1.2\times10^9\ L\ mol^{-1}\ s^{-1}$.	90A403
2.24	**Tris(1,10-phenanthroline)iron(III) ion**						
	$^{\bullet}CH_2CH_3 + Fe(phen)_3^{3+} \rightarrow H_2C{=}CH_2 + Fe(phen)_3^{2+} + H^+$	1.5×10^9		296	f.p.	D.k. in deaerated soln. contg. $C_2H_5Co(dmgH)_2OH_2$, assuming $k(^{\bullet}CH_2CH_3 + {}^{\bullet}CH_2CH_3) = 1.2\times10^9\ L\ mol^{-1}\ s^{-1}$.	90A403
		1.0×10^9	~1		p.r.	P.b.k. at 490 nm in soln. contg. ethane; probably inner-sphere mechanism.	85A284
2.25	**Ferricyanide ion**						
	$^{\bullet}CH_2CH_3 + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-} +$ other prod.	5.0×10^7	4-6	295	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. diethyl sulfoxide.	82A041
2.26	**Hexachloroiridate(IV) ion**						
	$^{\bullet}CH_2CH_3 + IrCl_6^{2-} \rightarrow C_2H_5Cl + IrCl_5^{2-}$	2.8×10^9		296	f.p.	D.k. in deaerated soln. contg. $C_2H_5Co(dmgH)_2OH_2$, assuming $k(^{\bullet}CH_2CH_3 + {}^{\bullet}CH_2CH_3) = 1.2\times10^9$.	90A403

TABLE 2. Ethyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	T (K)	Method	Comment	Ref.
2.26	***Hexachloroiridate(IV) ion*** — *Continued*						
		3.1×10^9	4-6	295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. diethyl sulfoxide or ethyl chloride.	82A041
2.27	**Permanganate ion**						
	$^{\bullet}CH_2CH_3 + MnO_4^- \rightarrow MnO_4^{2-}$ + other prod.	$\sim 2 \times 10^9$	4-6	295	p.r.	D.k. at 545 nm in N_2O-satd. soln. contg. diethyl sulfoxide or ethyl chloride.	82A041
2.28	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**						
	$^{\bullet}CH_2CH_3 + \alpha$-Ni(cyclam)$^{2+} + \rightarrow$ α-$CH_3CH_2Ni(cyclam)^{2+}$	2.3×10^8	0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 6.0 mol L^{-1} $HClO_4$.	91A515
2.29	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**						
	$^{\bullet}CH_2CH_3 + \beta$-Ni(cyclam)$^{2+} + \rightarrow$ β-$CH_3CH_2Ni(cyclam)^{2+}$	1.3×10^7	0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
2.30	**Oxygen**						
	$^{\bullet}CH_2CH_3 + O_2 \rightarrow C_2H_5OO^{\bullet}$	2.1×10^9	0	298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$; rel. to $k(^{\bullet}CH_2CH_3 + \beta\text{-Ni(cyclam)}^{2+}) = 1.3 \times 10^7$ L mol^{-1} s^{-1}.	91A176
		2.9×10^9			p.r.	P.b.k. at 270 nm in soln. contg. 6×10^{-5} mol L^{-1} O_2 and ethanc.	751055
2.31	**Pentaammine(bromo)ruthenium(III) ion**						
	$^{\bullet}CH_2CH_3 + Ru(NH_3)_5Br^{2+} \rightarrow C_2H_5Br + Ru(NH_3)_5^{2+}$	1.6×10^7	~1	296	f.p.	C.k. in deaerated soln. contg. $C_2H_5Co(dmgH)_2OH_2$, assuming $k(^{\bullet}CH_2CH_3 + {}^{\bullet}CH_2CH_3) = 1.2 \times 10^9$; rel. to $k(^{\bullet}CH_2CH_3 + IrCl_6^{2-}) = 2.8 \times 10^9$ L mol^{-1} s^{-1}.	90A403
		2.2×10^7	1	296	chem.	C.k. in deaerated soln. contg. 1.3×10^{-4} mol L^{-1} $(H_2O)_5CrC_2H_5^{2+}$, 4.0×10^{-4} mol L^{-1} $Fe(bpy)_3^{3+}$, 5.0×10^{-3} mol L^{-1} $Ru(NH_3)_5Br^{2+}$ and 0.10 mol L^{-1} $HClO_4$; rel. to $k(^{\bullet}CH_2CH_3 + Fe(bpy)_3^{3+}) = 9.2 \times 10^8$ L mol^{-1} s^{-1}.	90A403
2.32	**Hydrogen peroxomonosulfate ion**						
	$^{\bullet}CH_2CH_3 + HSO_5^- \rightarrow$	3.8×10^5			chem.	Esr study in soln. contg. Ti(III) sulfate, H_2O_2, HSO_5^- and diethyl sulfoxide.	90D226
2.33	**Peroxodisulfate ion**						
	$^{\bullet}CH_2CH_3 + S_2O_8^{2-} \rightarrow SO_4^{\bullet-} + SO_4^{2-}$ + other prod.	7.4×10^4		~293	chem.	Esr study in soln. contg. 0.008 mol L^{-1} Ti(III), 0.01 mol L^{-1} H_2O_2, (0-0.025) mol L^{-1} $S_2O_8^{2-}$ and ~0.01 mol L^{-1} Et_2SO.	84D044
2.34	**Vanadium(II) ion**						
	$^{\bullet}CH_2CH_3 + V^{2+} + H^+ \rightarrow C_2H_6 + V^{3+}$	4.3×10^5	2	296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator, 0.01-0.03 mol L^{-1} H^+, (1-5) $\times 10^{-4}$ mol L^{-1} $CH_3CH_2Co(dmgH)$ or $CH_3CH_2Co(cyclam)^{2+}$, (5-38) $\times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$, and 0.01-0.06 mol L^{-1} V^{2+}.	91A428
		$\sim 6 \times 10^5$		298	chem.	Calcd. from product anal. in soln. contg. V^{2+} and $C_2H_5C(CH_3)_2O_2H$ and $(CH_3)_2CHI$ knowing $k(^{\bullet}CH_2CH_2 + {}^{\bullet}CH_2CH_2)$.	86A020
2.35	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**						
	$^{\bullet}CH_2CH_3 + ABTS^{\bullet-} \rightarrow$ addn.	1.1×10^9	0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$) and alkylcobalt(III) complex.	91A515

TABLE 2. Ethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
2.35	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion — Continued**						
		9.2×10^8		296	f.p.	D.k. at 650 nm in deaerated soln. contg. $C_2H_5Co(dmgH)_2OH_2$, $ABTS^{2-}$ and Ce(IV), assuming $k(^{\bullet}CH_2CH_3 + {}^{\bullet}CH_2CH_3) = 1.2 \times 10^9$ L $mol^{-1}\ s^{-1}$.	90A403
2.36	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**						
	$^{\bullet}CH_2CH_3 + MV^{\bullet+} \rightarrow$ addn.	1.0×10^9	2	296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^+, (1-5) $\times$ 10^{-4} mol L^{-1} $CH_3CH_2Co(dmgH)$ or $CH_3CH_2Co(cyclam)^{2+}$, (5-38) $\times$ 10^{-6} mol L^{-1} $MV^{\bullet+}$; also see [91A427].	91A428
		1.2×10^9		296	f.p.	D.k. in deaerated soln. contg. $C_2H_5Co(dmgH)_2OH_2$, assuming $k(^{\bullet}CH_2CH_3 + {}^{\bullet}CH_2CH_3) = 1.2 \times 10^9$.	90A403
		1.0×10^9	<2	297	f.p.	D.k. at 600 nm ($MV^{\bullet+}$, $\varepsilon = 1.37 \times 10^4$ L mol^{-1} cm^{-1}, 0.01-0.1 mol L^{-1}); $MV^{\bullet+}$ from Zn/Hg redn. of MV^{2+}; (2-4) $\times$ 10^{-6} mol L^{-1} radical from photolysis of $CH_3CH_2Co(cyclam)^{2+}$.	89A338
2.37	**Ethanethiol**						
	$^{\bullet}CH_2CH_3 + C_2H_5SH \rightarrow C_2H_6 + C_2H_5S^{\bullet}$	2.8×10^7	7.0	~298	f.p.	P.b.k. at 650 nm using $ABTS^{\bullet-}$ as indicator in soln. contg. $ABTS^{2-}$ and $CH_3CH_2Co(cyclam)^{2+}$.	92A401 92A223
2.38	**2-Iodopropane**						
	$^{\bullet}CH_2CH_3 + (CH_3)_2CHI \rightarrow (CH_3)_2\dot{C}H + C_2H_5I$	~6×10^5		298	chem.	Calcd. from product anal. in soln. contg. V^{2+} and $C_2H_5C(CH_3)_2O_2H$ and excess $(CH_3)_2CHI$; rel. to $k(^{\bullet}CH_2CH_3 + V^{2+}) = 6 \times 10^5$ L $mol^{-1}\ s^{-1}$.	86A020
2.39	**2-Methyl-2-nitrosopropane**						
	$^{\bullet}CH_2CH_3 + (CH_3)_3CNO \rightarrow$ addn.	5.3×10^7	~7	~291	p.r.	P.b.k. (esr) in unbuffered N_2O-satd. soln. contg. 0.5 mol L^{-1} diethyl sulfoxide and (0.25-15) $\times$ 10^{-3} mol L^{-1} MNP (assuming complete dimer dissociation).	91D097

TABLE 3. Propyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
3.1	**Propyl**						
	$^{\cdot}CH_2CH_2CH_3 + {}^{\cdot}CH_2CH_2CH_3 \rightarrow$	6.3×10^8			p.r.	D.k.	91A117
3.2	***N-meso*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**						
	$^{\cdot}CH_2CH_2CH_3$ + *N-meso*-Co(4,11-dieneN$_4$)$^{2+} \rightarrow$ $CH_3CH_2CH_2Co(4,11\text{-dieneN}_4)^{2+}$	1.4×10^8	1.3-7	296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\cdot+}$ as indicator and $CH_3CH_2CH_2Co(cyclam)^{2+}$.	89A530
3.3	**Cobal(II)amin**						
	$^{\cdot}CH_2CH_2CH_3$ + B12r $\rightarrow$ addn.	6.1×10^8	7	296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. $CH_3CH_2CH_2Co(cyclam)^{2+}$ and cobal(II)amin.	89A530
3.4	**Chromium(II) ion**						
	$^{\cdot}CH_2CH_2CH_3 + Cr^{2+} \rightarrow$ $CrCH_2CH_2CH_3^{2+}$	2.2×10^8	<2	297	f.p.	D.k. at 600 nm in soln. contg. $MV^{\cdot+}$ as indicator and $CH_3CH_2CH_2Co(cyclam)^{2+}$.	89A338
3.5	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**						
	$^{\cdot}CH_2CH_2CH_3 + Cr([15]aneN_4)^{2+} \rightarrow$ $C_2H_5CH_2Cr([15]aneN_4)^{2+}$	8.5×10^7		298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\cdot+}$ as indicator and $RCo(dmgH)_2$.	91A427
3.6	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**						
	$^{\cdot}CH_2CH_2CH_3 + \alpha\text{-Ni(cyclam)}^{2+} \rightarrow$ $\alpha\text{-}CH_3CH_2CH_2Ni(cyclam)^{2+}$	1.7×10^8	0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\cdot-}$ as indicator, alkylcobalt(III) complex and 6.0 mol L^{-1} $HClO_4$.	91A515
3.7	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**						
	$^{\cdot}CH_2CH_2CH_3 + \beta\text{-Ni(cyclam)}^{2+} + \rightarrow$ $\beta\text{-}CH_3CH_2CH_2Ni(cyclam)^{2+}$	1.0×10^7	0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\cdot-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
3.8	**Oxygen**						
	$^{\cdot}CH_2CH_2CH_3 + O_2 \rightarrow$ $CH_3CH_2CH_2OO^{\cdot}$	1.9×10^9	8.5		p.r.	P.b.k. at 250 nm in soln. contg. propane, 2.8×10^{-3} mol L^{-1} N_2O and 1.25×10^{-3} mol L^{-1} O_2.	91A117
		3.5×10^9	0	298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$; rel. to $k(^{\cdot}CH_2CH_2CH_3 + \beta\text{-Ni(cyclam)}^{2+}) = 1.0 \times 10^7$ L mol^{-1} s^{-1}.	91A176
3.9	**Vanadium(II) ion**						
	$^{\cdot}CH_2CH_2CH_3 + V^{2+} + H^+ \rightarrow$ $CH_3CH_2CH_3 + V^{3+}$	2.4×10^5	2	296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\cdot+}$ as indicator, 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $CH_3CH_2CH_2Co(dmgH)_2$ or $CH_3CH_2CH_2Co(cyclam)^{2+}$ and 0.01-0.06 mol L^{-1} V^{2+}.	91A428
3.10	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**						
	$^{\cdot}CH_2CH_2CH_3 + ABTS^{\cdot-} \rightarrow$ addn.	1.2×10^9 1.0×10^9	0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\cdot-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 or 6.0 mol L^{-1} $HClO_4$.	91A515
3.11	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**						
	$^{\cdot}CH_2CH_2CH_3 + MV^{\cdot+} \rightarrow$ $CH_3(CH_2)_2MV^+$	1.0×10^9		298	f.p.	D.k. at 600 nm in soln. contg. $RCo(dmgH)_2$ and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\cdot+}$.	91A427
		1.2×10^9	2	296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $CH_3(CH_2)_2Co(dmgH)_2$ or $CH_3(CH_2)_2Co(cyclam)^{2+}$, $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\cdot+}$.	91A428
		1.2×10^9	<2	297	f.p.	D.k. at 600 nm ($MV^{\cdot+}$, $\varepsilon = 1.37 \times 10^4$ L mol^{-1} cm^{-1}, 0.01-0.1 mol L^{-1}); $MV^{\cdot+}$ from Zn/Hg redn. of MV^{2+}; $(2\text{-}4) \times 10^{-6}$ mol L^{-1} radical from photolysis of $CH_3CH_2CH_2Co(cyclam)^{2+}$.	89A338

TABLE 3. Propyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	T (K)	Method	Comment	Ref.
3.12	**2-Methyl-2-nitrosopropane**						
	$^{\bullet}CH_2CH_2CH_3 + (CH_3)_3CNO \rightarrow$ addn.	6.9×10^7	~7	~291	p.r.	P.b.k. (esr) in unbuffered N_2O-satd. soln. contg. 0.25 mol L^{-1} dipropyl sulfoxide and (0.25-15) $\times$ 10^{-3} mol L^{-1} MNP (assuming complete dimer dissociation).	91D097

TABLE 4. 1-Methylethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
4.1	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion**							
	$(CH_3)_2\dot{C}H + CoTPPS^{4-} \rightarrow$ $(CH_3)_2CHCoTPPS^{4-}$	1.9×10^9 2.0×10^9	8 13		294	p.r.	D.k. in N_2O-satd. soln. contg. 0.02 mol L^{-1} $[(CH_3)_2CH]_2SO$.	83A088
4.2	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$(CH_3)_2\dot{C}H + Cr([15]aneN_4)^{2+} \rightarrow$ $(CH_3)_2CHCr([15]aneN_4)^{2+}$	6.1×10^7			298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $RCo(dmgH)_2$.	91A427
4.3	**Copper(II) ion**							
	$(CH_3)_2\dot{C}H + Cu^{2+} + H_2O \rightarrow$ $(CH_3)_2CHOH + Cu^{+} + H^{+}$	4×10^6	1	1-1.3	298	chem.	C.k. in soln. contg. $(6\text{-}10) \times 10^{-4}$ mol L^{-1} $CrCH(CH_3)_2^{2+}$, 0.02-0.4 mol L^{-1} Cu^{2+} and oxygen; rel. to $k(^{\bullet}CH(CH_3)_2 + O_2) = 10^9$ L $mol^{-1}\ s^{-1}$.	82A479
4.4	**Ferricyanide ion**							
	$(CH_3)_2\dot{C}H + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-} +$ other prod.	1.3×10^9	4-6		295	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. di-(1-methylethyl) sulfoxide.	82A041
4.5	**Hexachloroiridate(IV) ion**							
	$(CH_3)_2\dot{C}H + IrCl_6^{2-} \rightarrow$	3.6×10^9	4-6		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. di-(1-methylethyl) sulfoxide; both e-transfer and chlorine transfer.	82A041
4.6	**1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion**							
	$(CH_3)_2\dot{C}H + Ni(Me_4[14]aneN_4)^{+} \rightarrow$ addn.	$\sim 10^6$				phot.	Estd. from product yields.	86M180
4.7	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$(CH_3)_2\dot{C}H + \alpha\text{-}Ni(cyclam)^{2+} + H_2O \rightarrow$ $\alpha\text{-}(CH_3)_2CHNi(cyclam)(H_2O)^{2+}$	6.2×10^6	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and alkylcobalt(III) complex.	91A515
4.8	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$(CH_3)_2\dot{C}H + \beta\text{-}Ni(cyclam)^{2+} \rightarrow$	$< 2 \times 10^5$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and alkylcobalt(III) complex.	91A515
4.9	**Oxygen**							
	$(CH_3)_2\dot{C}H + O_2 \rightarrow (CH_3)_2CHOO^{\bullet}$	3.8×10^9	1		298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and 0.1 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$.	91A176
4.10	**Vanadium(II) ion**							
	$(CH_3)_2\dot{C}H + V^{2+} + H^{+} \rightarrow CH_3CH_2CH_3 + V^{3+}$	2.4×10^5	2		296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator, 0.01-0.03 mol L^{-1} H^{+}, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $(CH_3)_2CHCo(dmgH)$ or $(CH_3)_2CHCo(cyclam)^{2+}$, $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$, and 0.01-0.06 mol L^{-1} V^{2+};	91A428
4.11	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$(CH_3)_2\dot{C}H + ABTS^{\bullet-} \rightarrow$ addn.	1.4×10^9 9.0×10^8	0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 or 6.0 mol L^{-1} $HClO_4$.	91A515
4.12	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$(CH_3)_2\dot{C}H + MV^{\bullet+} \rightarrow (CH_3)_2CHMV^{+}$	1.2×10^9			298	f.p.	D.k. at 600 nm in soln. contg. $RCo(dmgH)_2$ and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\bullet+}$.	91A427
		1.5×10^9	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^{+}, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $(CH_3)_2CHCo(dmgH)_2$ or $(CH_3)_2CHCo(cyclam)^{2+}$ and $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$.	91A428

TABLE 4. 1-Methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
4.13	**2-Methyl-2-nitrosopropane**							
	$(CH_3)_2\dot{C}H + (CH_3)_3CNO \rightarrow$ addn.	4.6×10^7	~7		~291	p.r.	P.b.k. (esr) in unbuffered N_2O-satd. soln. contg. 0.1 mol L^{-1} diisopropyl sulfoxide and $(0.25\text{-}15) \times 10^{-3}$ mol L^{-1} MNP (assuming complete dimer dissociation).	91D097

TABLE 5. Cyclopentyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
5.1	**Cyclopentyl**							
	$c\text{-}\dot{C}_5H_9 + c\text{-}\dot{C}_5H_9 \rightarrow$	1.0×10^9	7			p.r.	D.k. in soln. contg. N_2O and 1.3×10^{-5} mol L^{-1} cyclopentane; $\varepsilon = 480$ L $mol^{-1}cm^{-1}$ at 248 nm; products are bicyclopentyl, cyclopentane and cyclopentene.	741051
		2.0×10^9	10			p.r.	D.k. in N_2O-satd. soln. contg. cyclopentane.	741052
5.2	**Chromium(II) ion**							
	$c\text{-}\dot{C}_5H_9 + Cr^{2+} \rightarrow Cr\text{-}c\text{-}C_5H_9^{2+}$	8×10^7	3.3-4.0		295	p.r.	P.b.k. in N_2O-satd. soln. contg. ~0.01 mol L^{-1} cyclopentane and $(2\text{-}10) \times 10^{-4}$ mol L^{-1} Cr^{2+}.	83A345
5.3	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$c\text{-}\dot{C}_5H_9 + Cr([15]aneN_4)^{2+} \rightarrow c\text{-}C_5H_9Cr([15]aneN_4)^{2+}$	7.1×10^7	2		298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator, 0.01-0.03 mol L^{-1} H^+, $c\text{-}C_5H_9Co(dmgH)_2$ and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\bullet+}$.	91A427
5.4	**Nickel(I) ion**							
	$c\text{-}\dot{C}_5H_9 + Ni^+ \rightarrow c\text{-}C_5H_9Ni^+$	2.8×10^9				p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. $NiSO_4$ and cyclopentane.	741037
5.5	**1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion**							
	$c\text{-}\dot{C}_5H_9 + Ni(Me_4[14]aneN_4)^+ \rightarrow$ addn.	$\sim 10^5$	11			phot.	Estd. from ratio of products formed from radical.	86M180
5.6	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$c\text{-}\dot{C}_5H_9 + \alpha\text{-}Ni(cyclam)^{2+} + H_2O \rightarrow \alpha\text{-}c\text{-}\dot{C}_5H_9Ni(cyclam)(H_2O)^{2+}$	1.0×10^7	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and alkylcobalt(III) complex.	91A515
5.7	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$c\text{-}\dot{C}_5H_9 + \beta\text{-}Ni(cyclam)^{2+} \rightarrow$	$<2 \times 10^5$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and alkylcobalt(III) complex.	91A515
5.8	**Hydrogen peroxide**							
	$c\text{-}\dot{C}_5H_9 + H_2O_2 \rightarrow$	4.6×10^4				γ-r.	Estd. from dose rate effect on $G(H_2O_2)$, assuming $2k(R + R) = 2 \times 10^9$ in soln. contg. 2.5×10^{-3} mol L^{-1} cyclopentane and 0.01 mol L^{-1} N_2O.	76A254
5.9	**Oxygen**							
	$c\text{-}\dot{C}_5H_9 + O_2 \rightarrow c\text{-}C_5H_9OO^{\bullet}$	3.5×10^9	1		298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and 0.1 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$.	91A176
		4.9×10^9	7			p.r.	P.b.k. at 270 nm in N_2O/O_2 satd. soln. contg. cyclopentane.	741051
5.10	**Vanadium(II) ion**							
	$c\text{-}\dot{C}_5H_9 + V^{2+} \rightarrow c\text{-}C_5H_{10} + V^{3+}$	$\sim 1 \times 10^5$	2		296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator, 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $c\text{-}C_5H_9Co(dmgH)_2$ or $c\text{-}C_5H_9Co(cyclam)^{2+}$, $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$, and 0.01-0.06 mol L^{-1} V^{2+}.	91A428
5.11	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$c\text{-}\dot{C}_5H_9 + ABTS^{\bullet-} \rightarrow$ addn.	1.2×10^9 9.1×10^8	0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 or 6.0 mol L^{-1} $HClO_4$	91A515
5.12	**3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy**							
	$c\text{-}\dot{C}_5H_9 + NX\text{-}s \rightarrow$ addn.	3.5×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01-0.1 mol L^{-1} cyclopentane.	761152

TABLE 5. Cyclopentyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
5.13	**3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy**							
	c-$\dot{C}_5H_9$ + NX-u → addn.	3.6×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01-0.1 mol L^{-1} cyclopentane.	761152
5.14	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	c-$\dot{C}_5H_9$ + $MV^{\cdot+}$ → addn.	9.1×10^8	2		298	f.p.	D.k. at 600 nm in soln. contg. 0.01 mol L^{-1} H^+, c-$C_5H_9Co(dmgH)_2$ and $(1\text{-}5) \times 10^{-5}$ mol L^{-1} $MV^{\cdot+}$.	91A427
		1.2×10^9	2		296	f.p.	D.k. at 600 nm in soln. contg. 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} c-$C_5H_9Co(dmgH)_2$ or c-$C_5H_9Co(cyclam)^{2+}$ and $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\cdot+}$.	91A428
5.15	**2,2,6,6-Tetramethylpiperidine-*N*-oxyl**							
	c-$\dot{C}_5H_9$ + TMPN →	4.3×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01 mol L^{-1} cyclopentane; addn. reaction.	761067
5.16	**2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl**							
	c-$\dot{C}_5H_9$ + TAN →	4.0×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01 mol L^{-1} cyclopentane; addn. reaction.	761067

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
6.1	**1-Butyl**							
6.1.1	**1-Butyl**							
	$^{\bullet}CH_2(CH_2)_2CH_3 + {}^{\bullet}CH_2(CH_2)_2CH_3 \rightarrow$	5×10^8	8.5			p.r.	D.k.	91A117
6.1.2	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$^{\bullet}CH_2(CH_2)_2CH_3 + Cr([15]aneN_4)^{2+} \rightarrow C_3H_7CH_2Cr([15]aneN_4)^{2+}$	8.2×10^7			298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $RCo(dmgH)_2$.	91A427
6.1.3	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2(CH_2)_2CH_3 + \alpha\text{-}Ni(cyclam)^{2+} \rightarrow \alpha\text{-}CH_3(CH_2)_2CH_2Ni(cyclam)^{2+}$	2.3×10^8	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.1.4	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2(CH_2)_2CH_3 + \beta\text{-}Ni(cyclam)^{2+} + \rightarrow \beta\text{-}CH_3(CH_2)_2CH_2Ni(cyclam)^{2+}$	1.0×10^7	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.1.5	*Oxygen*							
	$^{\bullet}CH_2(CH_2)_2CH_3 + O_2 \rightarrow CH_3(CH_2)_3OO^{\bullet}$	1.3×10^9	8.5			p.r.	P.h.k. at 250 nm in soln. contg. butane, 2.8×10^{-3} mol L^{-1} N_2O and 1.25×10^{-3} mol L^{-1} O_2.	91A117
		1.8×10^9	0		298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$; rel. to $k(^{\bullet}CH_2(CH_2)_2CH_3 + \beta\text{-}Ni(cyclam)^{2+}) = 1.0 \times 10^7$ L mol^{-1} s^{-1}.	91A176
6.1.6	**Vanadium(II) ion**							
	$^{\bullet}CH_2(CH_2)_2CH_3 + V^{2+} + H^+ \rightarrow n\text{-}C_4H_{10} + V^{3+}$	2.5×10^5	2		296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator, 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $CH_3(CH_2)_3Co(dmgH)_2$ or $CH_3(CH_2)_3Co(cyclam)^{2+}$ and 0.01-0.06 mol L^{-1} V^{2+}.	91A428
6.1.7	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH_2(CH_2)_2CH_3 + ABTS^{\bullet-} \rightarrow$ addn.	1.3×10^9 8.4×10^8	0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 or 6.0 mol L^{-1} $HClO_4$;	91A515
6.1.8	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$^{\bullet}CH_2(CH_2)_2CH_3 + MV^{\bullet+} \rightarrow CH_3(CH_2)_3MV^+$	1.1×10^9	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $CH_3(CH_2)_3Co(dmgH)_2$ or $CH_3(CH_2)_3Co(cyclam)^{2+}$, $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$.	91A428
		1.2×10^9			298	f.p.	D.k. at 600 nm in soln. contg. $RCo(dmgH)_2$ and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\bullet+}$.	91A427
6.2	***tert*-Butyl**							
6.2.1	***tert*-Butyl**							
	$^{\bullet}C(CH_3)_3 + {}^{\bullet}C(CH_3)_3 \rightarrow$	1.4×10^9				p.r.	D.k. in N_2O-satd. soln. contg. *tert*-butyl sulfoxide.	80A014
6.2.2	**Ferricyanide ion**							
	$^{\bullet}C(CH_3)_3 + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-} +$ other prod.	3.6×10^9	4-6			p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. di-(*tert*-butyl) sulfoxide.	82A041
6.2.3	**Hexachloroiridate(IV) ion**							
	$^{\bullet}C(CH_3)_3 + IrCl_6^{2-} \rightarrow$	3.8×10^9	4-6			p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. di-(*tert*-butyl) sulfoxide; both *e*-transfer and Cl transfer.	82A041

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
6.3	**Cyclohexenyl**							
6.3.1	**Cyclohexenyl**							
	$c\text{-}C_6H_9 + c\text{-}C_6H_9 \rightarrow$	8×10^8	>13			p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. cyclohexene and 0.3 mol L^{-1} KOH; used G(radical) = 6.0.	741077
6.4	**Cyclohexyl**							
6.4.1	**Cyclohexyl**							
	$c\text{-}C_6H_{11} + c\text{-}C_6H_{11} \rightarrow$	6×10^8	−10.5			p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. cyclohexane; ε = 920 L mol^{-1} cm^{-1}.	741077
		7×10^8				p.r.	D.k. at 240 nm in N_2O-satd. soln. contg. cyclohexane; ε = 1480 L mol^{-1} cm^{-1}.	680385
6.4.2	**1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion**							
	$c\text{-}C_6H_{11} + Ni(Me_4[14]aneN_4)^+ \rightarrow$	$\sim 10^5$				phot.	Estd. from product yields.	86M180
6.5	**Cyclopentenyl**							
6.5.1	**Cyclopentenyl**							
	$c\text{-}C_5H_7 + c\text{-}C_5H_7 \rightarrow$	1.5×10^9	14			p.r.	D.k. in N_2O-satd. soln. contg. cyclopentene; used G(radical) = 6.0.	741052
6.6	**2,2-Dimethylpropyl**							
6.6.1	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$^{\bullet}CH_2C(CH_3)_3 + Cr([15]aneN_4)^{2+} \rightarrow (CH_3)_3CCH_2Cr([15]aneN_4)^{2+}$	6.3×10^7			298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $RCo(dmgH)_2$.	91A427
6.6.2	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2C(CH_3)_3 + \alpha\text{-}Ni(cyclam)^{2+} \rightarrow \alpha\text{-}(CH_3)_3CCH_2Ni(cyclam)^{2+}$	8.0×10^6	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.6.3	**Oxygen**							
	$^{\bullet}CH_2C(CH_3)_3 + O_2 \rightarrow (CH_3)_3CCH_2OO^{\bullet}$	2.7×10^9	1		298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and 0.1 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$.	91A176
6.6.4	**Vanadium(II) ion**							
	$^{\bullet}CH_2C(CH_3)_3 + V^{2+} + H^+ \rightarrow CH_3C(CH_3)_3 + V^{3+}$	3.5×10^5	2		296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator, 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $(CH_3)_3CCH_2Co(dmgH)_2$ or $(CH_3)_3CCH_2Co(cyclam)^{2+}$ and 0.01-0.06 mol L^{-1} V^{2+}.	91A428
6.6.5	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH_2C(CH_3)_3 + ABTS^{\bullet-} \rightarrow$ addn.	7.4×10^8	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 6.0 mol L^{-1} $HClO_4$.	91A515
6.6.6	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$^{\bullet}CH_2C(CH_3)_3 + MV^{\bullet+} \rightarrow$ addn.	9.7×10^8	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $(CH_3)_3CCH_2Co(dmgH)_2$ or $(CH_3)_3CCH_2Co(cyclam)^{2+}$, $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$.	91A428
		7.6×10^8			298	f.p.	D.k. at 600 nm in soln. contg. $RCo(dmgH)_2$ and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\bullet+}$.	91A427
6.7	**Heptyl**							
6.7.1	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2(CH_2)_5CH_3 + \beta\text{-}Ni(cyclam)^{2+} + \rightarrow \beta\text{-}CH_3(CH_2)_5CH_2Ni(cyclam)^{2+}$	7.8×10^6	0	1.0		f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
6.7	**Heptyl** — Continued							
6.7.2	**Oxygen**							
	$^{\bullet}CH_2(CH_2)_5CH_3 + O_2 \rightarrow CH_3(CH_2)_5CH_2OO^{\bullet}$	1.6×10^9	0		298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$; rel. to $k(^{\bullet}CH_2(CH_2)_5CH_3 + \beta\text{-Ni(cyclam)}^{2+}) = 7.8 \times 10^6$ L mol^{-1} s^{-1}.	91A176
6.7.3	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH_2(CH_2)_5CH_3 + ABTS^{\bullet-} \rightarrow$ addn.	1.2×10^9	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.8	**5-Hexenyl**							
6.8.1	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$^{\bullet}CH_2(CH_2)_3CH{=}CH_2 + Cr([15]aneN_4)^{2+} \rightarrow CH_2{=}CH(CH_2)_3CH_2Cr[15]aneN_4))^{2+}$	9×10^6				chem.	Calcd. from product anal. in soln. contg. $Cr([15]aneN_4)^{2+}$ and 6-bromo-1-hexene: $k(^{\bullet}CH_2(CH_2)_3CH{=}CH_2 \rightarrow c\text{-}C_5H_9\dot{C}H_2) = 1 \times 10^5\ s^{-1}$.	79A461
6.8.2	**1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion**							
	$^{\bullet}CH_2(CH_2)_3CH{=}CH_2 + Ni(Me_4[14]aneN_4)^{+} \rightarrow CH_2{=}CH(CH_2)_3CH_2Ni(Me_4[14]aneN_4)^{+}$	4×10^7 6×10^7	alk.		273 298	chem.	Calcd. from product anal. in soln. contg. $Ni(Me_4[14]aneN_4)^{+}$ and 6-bromo-1-hexene.	86A229
		$\sim 3 \times 10^7$				phot.	Estd. from product yields.	86M180
6.9	**Hexyl**							
6.9.1	**Hexyl**							
	$^{\bullet}CH_2(CH_2)_4CH_3 + {}^{\bullet}CH_2(CH_2)_4CH_3 \rightarrow$	6×10^8				p.r.	D.k. at 240 nm in N_2O-satd. soln. contg. hexane; $\varepsilon = 960$ L mol^{-1} cm^{-1}.	68O385
6.9.2	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2(CH_2)_4CH_3 + \beta\text{-Ni(cyclam)}^{2+} \rightarrow \beta\text{-}CH_3(CH_2)_4CH_2Ni(cyclam)^{2+}$	9.0×10^6	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.9.3	**Oxygen**							
	$^{\bullet}CH_2(CH_2)_4CH_3 + O_2 \rightarrow CH_3(CH_2)_4CH_2OO^{\bullet}$	3.9×10^9	0		298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$; rel. to $k(^{\bullet}CH_2(CH_2)_4CH_3 + \beta\text{-Ni(cyclam)}^{2+}) = 9.0 \times 10^6$ L mol^{-1} s^{-1}.	91A176
6.9.4	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH_2(CH_2)_4CH_3 + ABTS^{\bullet-} \rightarrow$ addn.	1.1×10^9	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.10	**1-Methylheptyl**							
6.10.1	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH(CH_3)(CH_2)_5CH_3 + \alpha\text{-Ni(cyclam)}^{2+} \rightarrow \alpha\text{-}CH_3(CH_2)_5CH(CH_3)Ni(cyclam)^{2+}$	1.0×10^7	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.10.2	**Oxygen**							
	$^{\bullet}CH(CH_3)(CH_2)_5CH_3 + O_2 \rightarrow CH_3(CH_2)_5\dot{C}H(CH_3)OO^{\bullet}$	3.7×10^9	1		298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and 0.1 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$.	91A176
6.10.3	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH(CH_3)(CH_2)_5CH_3 + ABTS^{\bullet-} \rightarrow$ addn.	1.0×10^9	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 6.0 mol L^{-1} $HClO_4$.	91A515

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
6.11	**1-Methylpropyl**							
6.11.1	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$^{\bullet}CH(CH_3)C_2H_5 + Cr([15]aneN_4)^{2+} \rightarrow C_2H_5CH(CH_3)Cr([15]aneN_4)^{2+}$	3.9×10^7			298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $RCo(dmgH)_2$.	91A427
6.11.2	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH(CH_3)C_2H_5 + \alpha\text{-}Ni(cyclam)^{2+} \rightarrow \alpha\text{-}C_2H_5CH(CH_3)Ni(cyclam)^{2+}$	6.5×10^6	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.11.3	**Oxygen**							
	$^{\bullet}CH(CH_3)C_2H_5 + O_2 \rightarrow CH_3CH_2CH(CH_3)OO^{\bullet}$	3.2×10^9	1		298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and 0.1 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$.	91A176
6.11.4	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH(CH_3)C_2H_5 + ABTS^{\bullet-} \rightarrow$ addn.	1.1×10^9	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 6.0 mol L^{-1} $HClO_4$.	91A515
6.11.5	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$^{\bullet}CH(CH_3)C_2H_5 + MV^{\bullet+} \rightarrow$ addn.	1.1×10^9			298	f.p.	D.k. at 600 nm in soln. contg. $RCo(dmgH)_2$ and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\bullet+}$.	91A427
6.12	**2-Methylpropyl**							
6.12.1	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$^{\bullet}CH_2CH(CH_3)_2 + Cr([15]aneN_4)^{2+} \rightarrow (CH_3)_2CHCH_2Cr([15]aneN_4)^{2+}$	7.3×10^7			298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $RCo(dmgH)_2$.	91A427
6.12.2	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2CH(CH_3)_2 + \alpha\text{-}Ni(cyclam)^{2+} \rightarrow \alpha\text{-}(CH_3)_2CHCH_2Ni(cyclam)^{2+}$	3.4×10^7	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.12.3	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2CH(CH_3)_2 + \beta\text{-}Ni(cyclam)^{2+} \rightarrow$	$<2 \times 10^5$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.12.4	**Oxygen**							
	$^{\bullet}CH_2CH(CH_3)_2 + O_2 \rightarrow (CH_3)_2CHCH_2OO^{\bullet}$	3.2×10^9	1		298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and 0.1 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$.	91A176
6.12.5	**Vanadium(II) ion**							
	$^{\bullet}CH_2CH(CH_3)_2 + V^{2+} + H^+ \rightarrow (CH_3)_2CHCH_3 + V^{3+}$	3.5×10^5	2		296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator, 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $(CH_3)_2CHCH_2Co(dmgH)_2$ or $(CH_3)_2CHCH_2Co(cyclam)^{2+}$ and 0.01-0.06 mol L^{-1} V^{2+}.	91A428
6.12.6	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH_2CH(CH_3)_2 + ABTS^{\bullet-} \rightarrow$ addn.	1.1×10^9 8.7×10^8	0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 or 6.0 mol L^{-1} $HClO_4$.	91A515
6.12.7	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$^{\bullet}CH_2CH(CH_3)_2 + MV^{\bullet+} \rightarrow$ addn.	9.2×10^8			298	f.p.	D.k. at 600 nm in soln. contg. $RCo(dmgH)_2$ and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\bullet+}$.	91A427
		1.2×10^9	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $(CH_3)_2CHCH_2Co(dmgH)_2$ or $(CH_3)_2CHCH_2Co(cyclam)^{2+}$, $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$.	91A428

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
6.13	**Octyl**							
6.13.1	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2(CH_2)_6CH_3 + \alpha\text{-Ni(cyclam)}^{2+} \rightarrow \alpha\text{-}CH_3(CH_2)_6CH_2Ni(cyclam)^{2+}$	1.6×10^8	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.13.2	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2(CH_2)_6CH_3 + \beta\text{-Ni(cyclam)}^{2+} + \rightarrow \beta\text{-}CH_3(CH_2)_6CH_2Ni(cyclam)^{2+}$	8.1×10^6	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.13.3	**Oxygen**							
	$^{\bullet}CH_2(CH_2)_6CH_3 + O_2 \rightarrow CH_3(CH_2)_6CH_2OO^{\bullet}$	2.4×10^9	0		298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$; rel. to $k(^{\bullet}CH_2(CH_2)_6CH_3 + \beta\text{-Ni(cyclam)}^{2+}) = 8.1 \times 10^6$ L mol^{-1} s^{-1}.	91A176
6.13.4	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH_2(CH_2)_6CH_3 + ABTS^{\bullet-} \rightarrow$ addn.	1.3×10^9 1.1×10^9	0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (*from* $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 or 6.0 mol L^{-1} $HClO_4$.	91A515
6.14	**Pentyl**							
6.14.1	**Pentyl**							
	$^{\bullet}CH_2(CH_2)_3CH_3 + {}^{\bullet}CH_2(CH_2)_3CH_3 \rightarrow$	1.2×10^9			297	p.r.	D.k. at 234 nm in N_2O-satd. soln. contg. pentane.	741019
6.14.2	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2(CH_2)_3CH_3 + \beta\text{-Ni(cyclam)}^{2+} + \rightarrow \beta\text{-}CH_3(CH_2)_3CH_2Ni(cyclam)^{2+}$	8.6×10^6	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.14.3	**Oxygen**							
	$^{\bullet}CH_2(CH_2)_3CH_3 + O_2 \rightarrow CH_3(CH_2)_3CH_2OO^{\bullet}$	3.8×10^9	0		298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$; rel. to $k(^{\bullet}CH_2(CH_2)_3CH_3 + \beta\text{-Ni(cyclam)}^{2+}) = 8.6 \times 10^6$ L mol^{-1} s^{-1}.	91A176
6.14.4	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH_2(CH_2)_3CH_3 + ABTS^{\bullet-} \rightarrow$ addn.	1.2×10^9	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
6.15	**Radicals from pentane**							
6.15.1	**Hydrogen peroxide**							
	$^{\bullet}C_5H_{11} + H_2O_2 \rightarrow$	3.4×10^4				γ-r.	Estd. from dose rate effect on $G(H_2O_2)$, assuming $2k(R + R) = 2 \times 10^9$ L mol^{-1} s^{-1} in soln. contg. 5×10^{-3} mol L^{-1} pentane and 0.01 mol L^{-1} N_2O.	76A254
6.16	**2-Phenylethyl**							
6.16.1	**2-Phenylethyl**							
	$C_6H_5CH_2\dot{C}H_2 + C_6H_5CH_2\dot{C}H_2 \rightarrow$	$\sim 2 \times 10^9$				p.r.	D.k. at 309 nm; $\varepsilon = 4300\text{-}4000$ L mol^{-1} cm^{-1}; radical from 3-phenylpropanoic acid.	81A236
6.17	**2-Propenyl**							
6.17.1	**1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion**							
	$^{\bullet}CH_2CH{=}CH_2 + Ni(Me_4[14]aneN_4)^{+} \rightarrow$	$<10^6$				phot.	Estd. from product yields.	86M180

TABLE 6. Miscellaneous Unsubstituted Alkyl and Alkenyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
6.18	**Trimethylcyclopropenyl**							
6.18.1	**Trimethylcyclopropenium cation**							
	$Cy^{\bullet} + Cy^{+} \rightarrow Cy_2^{+}$	8.3×10^8	5.1		298	p.r.	P.b.k. in soln. contg. 0.1 mol L^{-1} *tert*-BuOH and trimethylcyclopropenyl fluoroborate.	82A395
6.19	**Vinyl**							
6.19.1	**Oxygen**							
	$^{\bullet}CH{=}CH_2 + O_2 \rightarrow H_2C{=}CHOO^{\bullet}$	4.6×10^9				p.r.	P.b.k. in Ar/O_2 (9:1) satd. soln. contg. vinyl bromide.	94A221
6.19.2	**2-Propanol**							
	$^{\bullet}CH{=}CH_2 + 2\text{-PrOH} \rightarrow H_2C{=}CH_2 + (CH_3)_2\dot{C}OH$	2.0×10^5				p.r.	C.k. in Ar/O_2 (10:1) satd. soln. contg. vinyl bromide and 2-PrOH; rel. to $k(^{\bullet}CH{=}CH_2 + O_2) = 4.6 \times 10^9\ L\ mol^{-1}\ s^{-1}$.	94A221

TABLE 7. Bromomethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
7.1	***N-meso*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$^{\bullet}CH_2Br + N\text{-}meso\text{-}Co(4,11\text{-}dieneN_4)^{2+} \rightarrow BrCH_2Co(4,11\text{-}dieneN_4)^{2+}$	1.5×10^8	1.3-7		296	f.p.	D.k. at 650 nm in soln. contg. $MV^{\bullet+}$ as indicator and $BrCH_2Co(cyclam)^{2+}$.	89A530
7.2	**Cobal(II)amin**							
	$^{\bullet}CH_2Br + B12r \rightarrow$ addn.	9.1×10^8	7		296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. $BrCH_2Co(cyclam)^{2+}$ and cobal(II)amin.	89A530
7.3	**Chromium(II) ion**							
	$^{\bullet}CH_2Br + Cr^{2+} \rightarrow CrCH_2Br^{2+}$	2.2×10^8	<2		297	f.p.	D.k. at 650 nm in soln. contg. $MV^{\bullet+}$ as indicator and $BrCH_2Co(cyclam)^{2+}$.	89A338
7.4	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$^{\bullet}CH_2Br + Cr([15]aneN_4)^{2+} \rightarrow BrCH_2Cr([15]aneN_4)^{2+}$	1.3×10^8			298	f.p.	D.k. at 650 nm in soln. contg. $MV^{\bullet+}$ as indicator and $BrCH_2Co(cyclam)^{2+}$.	91A427
7.5	**Tris(1,10-phenanthroline)iron(III) ion**							
	$^{\bullet}CH_2Br + Fe(phen)_3^{3+} \rightarrow$ redn.	$\leq 10^7$	~1			p.r.	P.b.k. at 490 nm in soln. contg. CH_3Br; result unaffected by presence of *tert*-BuOH, therefore main reaction is with $^{\bullet}CH_3$.	85A284
7.6	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2Br + \alpha\text{-}Ni(cyclam)^{2+} \rightarrow \alpha\text{-}BrCH_2Ni(cyclam)(H_2O)^{2+}$	3.7×10^8	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 6.0 mol L^{-1} $HClO_4$.	91A515
7.7	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2Br + \beta\text{-}Ni(cyclam)^{2+} \rightarrow \beta\text{-}BrCH_2Ni(cyclam)(H_2O)^{2+}$	4.8×10^7	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator, alkylcobalt(III) complex and 6.0 mol L^{-1} $HClO_4$.	91A515
7.8	**Oxygen**							
	$^{\bullet}CH_2Br + O_2 \rightarrow CH_2BrOO^{\bullet}$	2.0×10^9	0		298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$; rel. to $k(^{\bullet}CH_2Br + \beta\text{-}Ni(cyclam)^{2+}) = 4.8 \times 10^7$ L mol^{-1} s^{-1}.	91A176
7.9	**Vanadium(II) ion**							
	$^{\bullet}CH_2Br + V^{2+} + H^+ \rightarrow CH_3Br + V^{3+}$	3.1×10^5	2		296	f.p.	D.k. at 650 nm in soln. contg. $MV^{\bullet+}$ as indicator, 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $BrCH_2Co(dmgH)_2$ or $BrCH_2Co(cyclam)^{2+}$, $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$, and 0.01-0.06 mol L^{-1} V^{2+}.	91A428
7.10	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH_2Br + ABTS^{\bullet-} \rightarrow$ addn.	2.0×10^9 2.3×10^9	0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 or 6.0 mol L^{-1} $HClO_4$.	91A515
7.11	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$^{\bullet}CH_2Br + MV^{\bullet+} \rightarrow$	2.1×10^9	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $BrCH_2Co(dmgH)_2$ or $BrCH_2Co(cyclam)^{2+}$, $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$.	91A428
		1.5×10^9			298	f.p.	D.k. at 600 nm in N_2O-satd. soln. contg. $RCo(dmgH)_2$ and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\bullet+}$.	91A427
		2.1×10^9	<2		297	f.p.	D.k. at 600 nm ($MV^{\bullet+}$, $\varepsilon = 1.37 \times 10^4$ L mol^{-1} cm^{-1}, 0.01-0.1 mol L^{-1}); $MV^{\bullet+}$ from Zn/Hg redn. of MV^{2+}; $(2\text{-}4) \times 10^{-6}$ mol L^{-1} radical from photolysis of $BrCH_2Co(cyclam)(H_2O)^{2+}$.	89A338

TABLE 8. Chloromethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
8.1	**Cobal(II)amin**							
	$^{\bullet}CH_2Cl + B12r \rightarrow$ addn.	5.8×10^8	7		296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. $ClCH_2Co(cyclam)^{2+}$ and cobal(II)amin.	89A530
8.2	**Chromium(II) ion**							
	$^{\bullet}CH_2Cl + Cr^{2+} \rightarrow CrCH_2Cl^{2+}$	2.4×10^8	<2		297	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $ClCH_2Co(cyclam)^{2+}$.	89A338
8.3	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$^{\bullet}CH_2Cl + Cr([15]aneN_4)^{2+} \rightarrow ClCH_2Cr([15]aneN_4)^{2+}$	9.3×10^7			298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $RCo(dmgH)_2$.	91A427
8.4	**Iron(II) deuteroporphyrin IX**							
	$^{\bullet}CH_2Cl + Fe(II)DP \rightarrow$	2×10^9	7.2			p.r.	Abs. changes in soln. contg. deuterohemin (chemically reduced by dithionite), 0.04 mol L^{-1} CH_2Cl_2 and 6.5 mol L^{-1} 2-PrOH.	80A011
8.5	**Ferricyanide ion**							
	$^{\bullet}CH_2Cl + Fe(CN)_6^{3-} \rightarrow$	$<5 \times 10^5$	4-6		295	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. dichloromethane.	82A041
8.6	**Hexachloroiridate(IV) ion**							
	$^{\bullet}CH_2Cl + IrCl_6^{2-} \rightarrow CH_2Cl_2 + IrCl_5^{2-}$	$\sim 1 \times 10^9$	4-6		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. dichloromethane.	82A041
8.7	**Permanganate ion**							
	$^{\bullet}CH_2Cl + MnO_4^- \rightarrow$	$\sim 1 \times 10^9$	4-6		295	p.r.	D.k. at 545 nm in N_2O-satd. soln. contg. dichloromethane.	82A041
8.8	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2Cl + \alpha\text{-}Ni(cyclam)^{2+} \rightarrow \alpha\text{-}ClCH_2Ni(cyclam)(H_2O)^{2+}$	2.1×10^8	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and alkylcobalt(III) complex.	91A515
8.9	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CH_2Cl + \beta\text{-}Ni(cyclam)^{2+} \rightarrow \beta\text{-}ClCH_2Ni(cyclam)(H_2O)^{2+}$	1.9×10^7	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and alkylcobalt(III) complex.	91A515
8.10	**Oxygen**							
	$^{\bullet}CH_2Cl + O_2 \rightarrow ClCH_2OO^{\bullet}$	1.9×10^9	0		298	f.p.	C.k. in O_2 contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2OH_2$ or $RCo(cyclam)H_2O^{2+}$; rel. to $k(^{\bullet}CH_2Cl + \beta\text{-}Ni(cyclam)^{2+}) = 1.9 \times 10^7$ L mol^{-1} s^{-1}.	91A176
8.11	**Vanadium(II) ion**							
	$^{\bullet}CH_2Cl + V^{2+} + H^+ \rightarrow CH_3Cl + V^{3+}$	1.5×10^5	2		296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator, 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $ClCH_2Co(dmgH)_2$ or $ClCH_2Co(cyclam)^{2+}$ and 0.01-0.06 mol L^{-1} V^{2+}.	91A428
8.12	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$^{\bullet}CH_2Cl + ABTS^{\bullet-} \rightarrow$ addn.	1.2×10^9	0	1.0, 6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 or 6.0 mol L^{-1} $HClO_4$.	91A515
8.13	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$^{\bullet}CH_2Cl + MV^{\bullet+} \rightarrow$	1.2×10^9	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^+, $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $ClCH_2Co(dmgH)_2$ or $ClCH_2Co(cyclam)^{2+}$, $(5\text{-}38) \times 10^{-6}$ mol L^{-1} $MV^{\bullet+}$.	91A428

TABLE 8. Chloromethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
8.13	**1,1'-Dimethyl-4,4'-bipyridinium radical cation** — Continued							
		1.1×10^9			298	f.p.	D.k. at 600 nm in N_2O-satd. soln. contg. $RCo(dmgH)_2$ and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\bullet+}$.	91A427
		1.4×10^9	<2		297	f.p.	D.k. at 600 nm ($MV^{\bullet+}$, $\varepsilon = 1.37 \times 10^4$ L mol^{-1} cm^{-1}, $0.1\text{-}1 \times 10^{-1}$ mol L^{-1}); $MV^{\bullet+}$ from Zn/Hg redn. of MV^{2+}; $2\text{-}4 \times 10^{-6}$ mol L^{-1} radical from photolysis of $ClCH_2Co(cyclam)(H_2O)^{2+}$.	89A338

TABLE 9. Trifluoromethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
9.1	**Iron(II) deuteroporphyrin IX**							
	$^{\bullet}CF_3 + DPFe^{II} \rightarrow CF_3Fe^{III}DP$	2.0×10^9	alk.			p.r.	P.b.k. at 460 nm in CF_3Br satd. soln. contg. 6.5 mol L^{-1} 2-PrOH, 10^{-4} mol L^{-1} $DPFe^{II}$ and 0.05 mol L^{-1} NaOH.	87A232
9.2	**Iron(III) deuteroporphyrin IX**							
	$^{\bullet}CF_3 + DPFe^{III} \rightarrow$	4.5×10^8	alk.			p.r.	D.k. at 520 nm in CF_3Br satd. soln. contg. 6.5 mol L^{-1} 2-PrOH, 10^{-4} mol L^{-1} $DPFe^{III}$ and 0.05 mol L^{-1} NaOH.	87A232
9.3	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion**							
	$^{\bullet}CF_3 + MnTPPS^{3-} \rightarrow$ addn.	9.2×10^7	11.4		295	p.r.	Absorption changes at 530 and 590 nm in soln. contg. CF_3Br, 1% 2-PrOH, and 5×10^{-5} mol L^{-1} $MnTPPS^{3-}$.	92A391
9.4	**Aniline**							
	$^{\bullet}CF_3 + C_6H_5NH_2 \rightarrow$ addn.	5.6×10^6	9-10			p.r.	C.k.; rel. to $k(^{\bullet}CF_3 + HCO_2^-) = 3.4 \times 10^5$ L mol^{-1} s^{-1}.	700407
		4.7×10^6	9-10			p.r.	P.b.k. at 330 nm in N_2O-satd. soln. contg. CF_3Cl.	700407
9.5	**Butadiene**							
	$^{\bullet}CF_3 + H_2C{=}CHCH{=}CH_2 \rightarrow$ addn.	5.8×10^8	9-10			γ-r.	C.k. with 2-PrOH in soln. contg. CF_3Cl; rel. to $k(^{\bullet}CF_3 + HCO_2^-) = 3.4 \times 10^5$ L mol^{-1} s^{-1}.	700407
9.6	**1-Butene**							
	$^{\bullet}CF_3 + CH_3CH_2CH{=}CH_2 \rightarrow$ addn.	5.3×10^7	9-10			γ-r.	C.k. with 2-PrOH in soln. contg. CF_3Cl; rel. to $k(^{\bullet}CF_3 + HCO_2^-) = 3.4 \times 10^5$ L mol^{-1} s^{-1}.	700407
9.7	**Ethanol**							
	$^{\bullet}CF_3 + EtOH \rightarrow CF_3H + CH_3\dot{C}HOH$	4.6×10^4	9-10			γ-r.	C.k. with propylene; rel. to $k(^{\bullet}CF_3 + HCO_2^-) = 3.4 \times 10^5$ L mol^{-1} s^{-1}.	700407
9.8	**Ethylene**							
	$^{\bullet}CF_3 + H_2C{=}CH_2 \rightarrow CF_3CH_2\dot{C}H_2$	$\sim 7 \times 10^8$	5.9			p.r.	Estd. from yields and condy. meas. in soln. contg. CF_3Cl and ethylene.	710026
		4.0×10^7	9-10			γ-r.	C.k. with 2-PrOH; rel. to $k(^{\bullet}CF_3 + HCO_2^-) = 3.4 \times 10^5$ L mol^{-1} s^{-1}.	700407
9.9	**Formate ion**							
	$^{\bullet}CF_3 + HCO_2^- \rightarrow CF_3H + {}^{\bullet}CO_2^-$	3.4×10^5	9-10			p.r.	P.b.k. at 270 nm; radical from $CF_3Cl + e_{aq}^-$.	700407
9.10	**Fumarate ion**							
	$^{\bullet}CF_3 + trans\text{-}{}^-O_2CCH{=}CHCO_2^- \rightarrow {}^-O_2C\dot{C}HCH(CF_3)CO_2^-$	$\sim 10^8$				e-r.	Estd. from esr measurements of $^{\bullet}CF_3$ trapping by 0.001 mol L^{-1} fumarate ion.	710284
9.11	**Methanol**							
	$^{\bullet}CF_3 + MeOH \rightarrow CF_3H + {}^{\bullet}CH_2OH$	8×10^3	9-10			γ-r.	C.k. with propylene; rel. to $k(^{\bullet}CF_3 + HCO_2^-) = 3.4 \times 10^5$ L mol^{-1} s^{-1}.	700407
9.12	***aci*-Nitromethane anion**							
	$^{\bullet}CF_3 + CH_2NO_2^- \rightarrow CF_3CH_2\dot{N}O_2^-$	5×10^8				γ-r.	C.k. in soln. contg. 1 mol L^{-1} 2-PrOH and CF_3Cl; product radical identified by esr; rel. to $k(^{\bullet}CF_3 + 2\text{-PrOH}) = 9 \times 10^4$ L mol^{-1} s^{-1}.	720244
9.13	**1-Propanol**							
	$^{\bullet}CF_3 + 1\text{-PrOH} \rightarrow$	4.4×10^4	9-10			γ-r.	C.k. with propylene; rel. to $k(^{\bullet}CF_3 + HCO_2^-) = 3.4 \times 10^5$ L mol^{-1} s^{-1}.	700407
9.14	**2-Propanol**							
	$^{\bullet}CF_3 + 2\text{-PrOH} \rightarrow CF_3H + (CH_3)_2\dot{C}OH$	9.2×10^4	9-10			γ-r.	C.k. with propylene; rel. to $k(^{\bullet}CF_3 + HCO_2^-) = 3.4 \times 10^5$ L mol^{-1} s^{-1}.	700407

TABLE 9. Trifluoromethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
9.15	**Propylene**							
	$^{\bullet}CF_3 + CH_3CH{=}CH_2 \rightarrow$ addn.	7.2×10^7	9-10			γ-r.	C.k. with 2-PrOH; radical from CF_3Cl; rel. to $k(^{\bullet}CF_3 + HCO_2^-) = 3.4 \times 10^5\ L\ mol^{-1}\ s^{-1}$.	700407

TABLE 10. Trichloromethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
10.1	**Trichloromethyl**							
	$^{\bullet}CCl_3 + {}^{\bullet}CCl_3 \rightarrow CCl_3CCl_3$	3.7×10^8	5.5-12			p.r.	D.k. at 230 nm in soln. contg. 10^{-4} mol L^{-1} CCl_4; $\varepsilon = 2300\ L\ mol^{-1}\ cm^{-1}$.	741043
10.2	**Copper(II) ion**							
	$^{\bullet}CCl_3 + Cu^{2+} \rightarrow CuCCl_3^{2+}$	$\sim 3 \times 10^7$	6			p.r.	P.b.k. in Ar-satd. soln. contg. $(2\text{-}10) \times 10^{-5}$ mol L^{-1} $CuSO_4$ and $(1\text{-}10) \times 10^{-2}$ mol L^{-1} $CHCl_3$. Adduct yields Cu^+.	80A277
10.3	**Iron(II) deuteroporphyrin IX**							
	$^{\bullet}CCl_3 + DPFe^{II} \rightarrow$	$\sim 2 \times 10^9$	7.2			p.r.	Abs. changes in soln. contg. 50% 2-PrOH, 0.032 mol L^{-1} acetone, CCl_4, and deuterohemin, the latter reduced by $(CH_3)_2\dot{C}OH$.	80A011
10.4	**Iron(III) deuteroporphyrin IX**							
	$^{\bullet}CCl_3 + DPFe^{III} \rightarrow$	$\leq 10^6$	7.2			p.r.	No spectral change in soln. contg. 50% 2-PrOH, 0.005 mol L^{-1} CCl_4 and 10^{-4} mol L^{-1} deuterohemin.	80A011
10.5	**Hexachloroiridate(IV) ion**							
	$^{\bullet}CCl_3 + IrCl_6^{2-} \rightarrow IrCl_5^{2-} + CCl_4$	2.8×10^7	4-6		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. carbon tetrachloride.	82A041
10.6	**Permanganate ion**							
	$^{\bullet}CCl_3 + MnO_4^- \rightarrow MnO_4^{2-}$ + other prod.	4×10^8	4-6		295	p.r.	D.k. at 545 nm in N_2O-satd. soln. contg. carbon tetrachloride.	82A041
10.7	**Oxygen**							
	$^{\bullet}CCl_3 + O_2 \rightarrow CCl_3OO^{\bullet}$	3.3×10^9				p.r.	Eval. from leveling off of rate of reactions with metiazinic acid at high concn. of substrate in air-satd. soln. contg. 30% 2-PrOH, 10% acetone and 0.04 mol L^{-1} carbon tetrachloride.	83G216
10.8	**Diethyl ether**							
	$^{\bullet}CCl_3 + (C_2H_5)_2O \rightarrow CHCl_3 + CH_3\dot{C}HOC_2H_5$	3×10^1				γ-r.	Calcd. from dependence of $G(Cl^-)$ on dose rate in soln. contg. CCl_4 and ethyl ether assuming $2k(^{\bullet}CCl_3 + {}^{\bullet}CCl_3) = 10^9\ L\ mol^{-1}\ s^{-1}$.	710778
10.9	**2-Propanol**							
	$^{\bullet}CCl_3 + 2\text{-PrOH} \rightarrow CHCl_3 + (CH_3)_2\dot{C}OH$	8×10^1				γ-r.	Calcd. from dependence of $G(Cl^-)$ on dose rate in soln. contg. CCl_4 and 2-PrOH assuming $2k(^{\bullet}CCl_3 + {}^{\bullet}CCl_3) = 10^9\ L\ mol^{-1}\ s^{-1}$.	710778
10.10	**Tetrahydrofuran**							
	$^{\bullet}CCl_3 + THF \rightarrow$	5×10^1				γ-r.	Calcd. from dependence of $G(Cl^-)$ on dose rate in soln. contg. CCl_4 and tetrahydrofuran assuming $2k(^{\bullet}CCl_3 + {}^{\bullet}CCl_3) = 10^9\ L\ mol^{-1}\ s^{-1}$.	710778

TABLE 11. Miscellaneous haloalkyl and haloalkenyl radicals

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
11.1	**2-Bromo-1,2-difluoroethyl**						
11.1.1	**First-order reaction**						
	$CHBrF\dot{C}HF \rightarrow CHF{=}CHF + Br^{\bullet}$	$5.5 \times 10^5\ s^{-1}$			p.r.	Derived from buildup of $Br_2^{\bullet-}$ in N_2-satd. soln. contg. 40% *tert*-BuOH, 1,2-dibromo-1,2-difluoroethane and bromide ion.	93A578
11.2	**2-Bromoethyl**						
11.2.1	**First-order reaction**						
	$^{\bullet}CH_2CH_2Br \rightarrow H_2C{=}CH_2 + Br^{\bullet}$	$3.8 \times 10^6\ s^{-1}$			p.r.	Derived from absorbance buildup of promethazine radical cation (from $Br^{\bullet}$ + promethazine) in Ar-satd. soln. contg. 1,2-dibromoethane.	*94A309*
		$6.3 \times 10^5\ s^{-1}$			p.r.	Derived from buildup of $Br_2^{\bullet-}$ in N_2-satd. soln. contg. 40% *tert*-BuOH, 1,2-dibromoethane and bromide ion.	93A578
		$2.8 \times 10^6\ s^{-1}$			p.r.	Derived from buildup of $Br_2^{\bullet-}$ in N_2-satd. soln. contg. 10% *tert*-BuOH, 1,2-dibromoethane and bromide ion.	86A581
11.2.2	**Tris(1,10-phenanthroline)iron(III) ion**						
	$^{\bullet}CH_2CH_2Br + Fe(phen)_3^{3+} \rightarrow$	$\sim 1 \times 10^9$	~1		p.r.	P.b.k. at 490 nm in soln. contg. CH_3CH_2Br; also contains $CH_3\dot{C}HBr$ and $CH_3\dot{C}H_2$ (from H reaction).	85A284
11.2.3	**Oxygen**						
	$^{\bullet}CH_2CH_2Br + O_2 \rightarrow BrCH_2CH_2OO^{\bullet}$	1.6×10^9	4		p.r.	Derived from buildup of $Br_2^{\bullet-}$ in N_2/O_2-satd. soln. contg. 40% *tert*-BuOH, 0.02 mol L^{-1} 1,2-dibromoethane 4×10^{-4} mol L^{-1} bromide ion and varied $[O_2]$.	93A578
11.3	**1-(Bromomethyl)ethyl**						
11.3.1	**Water**						
	$CH_3\dot{C}HCH_2Br + H_2O \rightarrow H^+ + Br^- + CH_3\dot{C}HCH_2OH$	$7 \times 10^3\ s^{-1}$	4.5-5	292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} 1- or 2-bromopropane.	82A350
11.4	**1-(Bromomethyl)propyl**						
11.4.1	**Water**						
	$CH_3CH_2\dot{C}HCH_2Br + H_2O \rightarrow H^+ + Br^- + CH_3CH_2\dot{C}HCH_2OH$	$10^4\ s^{-1}$	4.5-5	292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} 1-bromobutane.	82A350
11.5	**2-Bromo-1-methylpropyl**						
11.5.1	**First-order reaction**						
	$CH_3\dot{C}HCHBrCH_3 \rightarrow CH_3CH{=}CHCH_3 + Br^{\bullet}$	$5.0 \times 10^5\ s^{-1}$			p.r.	Derived from buildup of $Br_2^{\bullet-}$ in N_2-satd. soln. contg. 40% *tert*-BuOH, 2,3-dibromobutane and bromide ion.	93A578
11.5.2	**Water**						
	$CH_3\dot{C}HCHBrCH_3 + H_2O \rightarrow H^+ + Br^- + {}^{\bullet}CH(CH_3)CH(CH_3)OH$	$\geq 10^6\ s^{-1}$	4.5-5	292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} 2-bromobutane.	82A350
11.6	**2-Chlorocyclohexyl**						
11.6.1	**Water**						
	$c\text{-}C_6H_{10}Cl + H_2O \rightarrow H^+ + Cl^- + \text{-}\dot{C}HCHOH(CH_2)_4\text{-}$	$\geq 10^6\ s^{-1}$	4.5-5	292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} chlorocyclohexane.	82A350
11.7	**1-Chloroethyl**						
11.7.1	**Oxygen**						
	$CH_3\dot{C}HCl + O_2 \rightarrow CH_3CHClOO^{\bullet}$	9.0×10^8			p.r.	Eval. from leveling off of rate of reaction of peroxyl radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L^{-1} *tert*-BuOH and 1,1-dichloroethane.	88A364

TABLE 11. Miscellaneous haloalkyl and haloalkenyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T(K)	Method	Comment	Ref.
11.8	**2-Chloroethyl**						
11.8.1	**Hexachloroiridate(IV) ion**						
	$^{\cdot}CH_2CH_2Cl + IrCl_6^{2-} \rightarrow IrCl_5(H_2O)^{2-} + ClCH_2CH_2Cl$	$\sim 1 \times 10^9$	4-6		p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. 1,2-dichloroethane.	82A041
11.9	**1-(1-Chloroethyl)ethyl**						
11.9.1	**Water**						
	$CH_3\dot{C}HCHClCH_3 + H_2O \rightarrow H^+ + Cl^- + {}^{\cdot}CH(CH_3)CH(CH_3)OH$	$3.5 \times 10^5\ s^{-1}$	4.5-5	292	p.r.	Condy. changes in N_2O satd. soln. contg. 0.001-0.01 mol L^{-1} 2-chlorobutane; same result following reaction of e_{aq}^- with 2,3-dichlorobutane.	82A350
11.10	**1-(Chloromethyl)ethyl**						
11.10.1	**First-order reaction**						
	$CH_3\dot{C}HCH_2Cl \rightarrow$	$<10^2\ s^{-1}$	4.5-5	292	p.r.	Condy. changes; acid formn. in N_2O-satd. soln. of 1-chloropropane.	82A350
11.11	**1-(Chloromethyl)-1-methylethyl**						
11.11.1	**Water**						
	$(CH_3)_2\dot{C}CH_2Cl + H_2O \rightarrow H^+ + Cl^- + (CH_3)_2\dot{C}CH_2OH$	$3.5 \times 10^4\ s^{-1}$	4.5-5	292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} 1-chloro-2-methylpropane.	82A350
11.12	**1-(Chloromethyl)propyl**						
11.12.1	**First-order reaction**						
	$CH_3CH_2\dot{C}HCH_2Cl \rightarrow$	$<10^2\ s^{-1}$	4.5-5	292	p.r.	Condy. changes; acid formn. in N_2O-satd. soln. of 1-chlorobutane.	82A350
11.13	**1-Chloro-2,2,2-trifluoroethyl**						
11.13.1	**Iron(II) deuteroporphyrin IX**						
	$CF_3\dot{C}HCl + Fe(II)DP \rightarrow CF_3CHClFe(III)DP$	7×10^9	~13		p.r.	Changes in absorbance at 540 nm in soln. contg. 0.0034 mol L^{-1} halothane, 0.05 mol L^{-1} NaOH, 0.68 mol L^{-1} acetone and 6.5 mol L^{-1} 2-PrOH.	82A222
11.13.2	**Iron(II) deuteroporphyrin, dimethyl ester**						
	$CF_3\dot{C}HCl + DPDMEFe^{II} \rightarrow DPDMEFe^{III}CF_3CHCl$	1.4×10^{10}	~3		p.r.	Changes in absorbance at 540 nm in soln. contg. 0.0034 mol L^{-1} halothane, 1.2×10^{-3} mol L^{-1} $HClO_4$, 0.68 mol L^{-1} acetone and 6.5 mol L^{-1} 2-PrOH.	82A222
11.13.3	**Iron(III) deuteroporphyrin IX**						
	$CF_3\dot{C}HCl + Fe(III)DP \rightarrow$	$\leq 10^6$	~13		p.r.	No reaction obs.	82A222
11.13.4	**Iron(III) deuteroporphyrin, dimethyl ester**						
	$CF_3\dot{C}HCl + DPDMEFe^{III} \rightarrow$	$\leq 10^6$	~3		p.r.	No reaction obs. in soln. contg. 6.5 mol L^{-1} 2-PrOH.	82A222
11.13.5	**Oxygen**						
	$CF_3\dot{C}HCl + O_2 \rightarrow CF_3CHClOO^{\cdot}$	1.3×10^9			p.r.	Eval. from leveling off of rate of reactions with ABTS, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 10^{-2} mol L^{-1} halothane.	83A195
11.13.6	**Ascorbate ion**						
	$CF_3\dot{C}HCl + AH^- \rightarrow$	$<10^5$	7		p.r.	No abs. detected in deaerated 10% *tert*-BuOH soln.	83A195
11.13.7	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate ion)**						
	$CF_3\dot{C}HCl + ABTS^{2-} \rightarrow$	$<10^5$	7		p.r.	No abs. detected in deaerated 10% *tert*-BuOH soln.	83A195
11.13.8	**Ethanol**						
	$CF_3\dot{C}HCl + EtOH \rightarrow CF_3CH_2Cl + CH_3\dot{C}HOH$	1.3×10^2	4		γ-r.	Estd. from $G(Br^-)$ of chain reaction in N_2-satd. soln. contg. 0.1 mol L^{-1} EtOH and 0.001 mol L^{-1} halothane using $2k(R + R) = 1 \times 10^9$ L mol^{-1} s^{-1}.	84G166

TABLE 11. Miscellaneous haloalkyl and haloalkenyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T (K)	Method	Comment	Ref.
11.13	**1-Chloro-2,2,2-trifluoroethyl** — Continued						
11.13.9	**Formate ion**						
	$CF_3\dot{C}HCl + HCO_2^- \rightarrow CF_3CH_2Cl + {}^{\bullet}CO_2^-$	2.9×10^3	4		γ-r.	Estd. from $G(Br^-)$ of chain reaction in N_2-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} halothane using $2k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	84G166
11.13.10	**Methanol**						
	$CF_3\dot{C}HCl + MeOH \rightarrow CF_3CH_2Cl + {}^{\bullet}CH_2OH$	2.7×10^1	4		γ-r.	Estd. from $G(Br^-)$ of chain reaction in N_2-satd. soln. contg. 0.1 mol L^{-1} MeOH and 0.001 mol L^{-1} halothane using $2k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	84G166
11.13.11	**2-Propanol**						
	$CF_3\dot{C}HCl + 2\text{-PrOH} \rightarrow CF_3CH_2Cl + (CH_3)_2\dot{C}OH$	6.7×10^2	4		γ-r.	Estd. from $G(Br^-)$ of chain reaction in N_2-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and 0.001 mol L^{-1} halothane using $2k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	84G166
11.13.12	**Propyl 3,4,5-trihydroxybenzoate**						
	$CF_3\dot{C}HCl + 3,4,5\text{-}(HO)_3C_6H_2CO_2C_3H_7 \rightarrow$	$<10^5$	7		p.r.	No abs. detected in deaerated 10% *tert*-BuOH soln.	83A195
11.14	**2-Chlorovinyl**						
11.14.1	**Oxygen**						
	${}^{\bullet}CH{=}CHCl + O_2 \rightarrow CHCl{=}CHOO^{\bullet}$	4.6×10^9			p.r.	P.b.k. in Ar/O_2 (9:1) satd. soln. contg. *trans*-1,2-dichloroethylene.	94A221
11.14.2	**Methanol**						
	${}^{\bullet}CH{=}CHCl + MeOH \rightarrow H_2C{=}CHCl + {}^{\bullet}CH_2OH$	2.1×10^5			p.r.	C.k. in Ar/O_2 (10:1) satd. soln. contg. *trans*-dichloroethylene and MeOH; rel. to $k({}^{\bullet}CH{=}CHCl + O_2) = 4.6 \times 10^9$ L $mol^{-1}\ s^{-1}$;	94A221
11.14.3	**2-Propanol**						
	${}^{\bullet}CH{=}CHCl + 2\text{-PrOH} \rightarrow H_2C{=}CHCl + (CH_3)_2\dot{C}OH$	5.6×10^6			p.r.	C.k. in Ar/O_2 (10:1) satd. soln. contg. *trans*-dichloroethylene and 2-PrOH; rel. to $k({}^{\bullet}CH{=}CHCl + O_2) = 4.6 \times 10^9$ L $mol^{-1}\ s^{-1}$;	94A221
11.15	**1,2-Dibromoethyl**						
11.15.1	**First-order reaction**						
	$CH_2Br\dot{C}HBr \rightarrow Br^{\bullet} + H_2C{=}CHBr$	$\sim 10^6\ s^{-1}$	5.7		p.r.	Derived from buildup of $Br_2^{\bullet -}$ in N_2O-satd. soln. contg. 1,2-dibromoethane and bromide ion.	86A581
11.16	**Dibromomethyl**						
11.16.1	**Ethanol**						
	${}^{\bullet}CHBr_2 + EtOH \rightarrow CH_2Br_2 + CH_3\dot{C}HOH$	1×10^2	6.8		γ-r.	Estd. from $G(Br^-)$ in N_2O- or Ar-satd. soln. contg. $CHBr_3$ and varied [EtOH] using $k(R + R) \sim 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	88G086
11.16.2	**Methanol**						
	${}^{\bullet}CHBr_2 + MeOH \rightarrow CH_2Br_2 + {}^{\bullet}CH_2OH$	6×10^1	6.8		γ-r.	Estd. from $G(Br^-)$ in N_2O-satd. soln. contg. $CHBr_3$ and varied [MeOH] using $k(R + R) \sim 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	88G086
11.16.3	**2-Propanol**						
	${}^{\bullet}CHBr_2 + 2\text{-PrOH} \rightarrow CH_2Br_2 + (CH_3)_2\dot{C}OH$	5×10^2	6.8		γ-r.	Estd. from $G(Br^-)$ in N_2O- or Ar-satd. soln. contg. $CHBr_3$ and varied [2-PrOH] using $k(R + R) \sim 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	88G086
11.17	**1,1-Dichloroethyl**						
11.17.1	**Oxygen**						
	$CH_3\dot{C}Cl_2 + O_2 \rightarrow CH_3CCl_2OO^{\bullet}$	1.5×10^9			p.r.	Eval. from leveling off of rate of reaction of peroxyl radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L^{-1} *tert*-BuOH and 1,1,1-trichloroethane.	88A364

TABLE 11. Miscellaneous haloalkyl and haloalkenyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T(K)	Method	Comment	Ref.
11.18	**1,2-Dichloroethyl**						
11.18.1	**Oxygen**						
	$CH_2ClCHCl + O_2 \rightarrow CH_2ClCHClOO^{\bullet}$	9.7×10^8			p.r.	Eval. from leveling off of rate of reaction of peroxyl radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L^{-1} *tert*-BuOH and 1,1,2-trichloroethane.	88A364
11.19	**Dichlorofluoromethyl**						
11.19.1	**Ethylene**						
	$^{\bullet}CFCl_2 + H_2C{=}CH_2 \rightarrow CFCl_2CH_2\dot{C}H_2$	$\sim 4 \times 10^7$	5.9		p.r.	Estd. from condy. changes in soln. contg. $CFCl_3$.	710026
11.20	***Dichloromethyl***						
11.20.1	**Copper(II) ion**						
	$^{\bullet}CHCl_2 + Cu^{2+} \rightarrow CuCHCl_2^{2+}$	$\sim 3 \times 10^7$	6	295	p.r.	P.b.k. in Ar-satd. soln. contg. $(2\text{-}10) \times 10^{-5}$ mol L^{-1} $CuSO_4$ and $(1\text{-}10) \times 10^{-2}$ mol L^{-1} $CHCl_3$; also includes $^{\bullet}CCl_3$ reaction.	80A277
11.20.2	**Ferricyanide ion**						
	$^{\bullet}CHCl_2 + Fe(CN)_6^{3-} \rightarrow$	$< 5 \times 10^5$	4-6		p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. chloroform.	82A041
11.20.3	**Hexachloroiridate(IV) ion**						
	$^{\bullet}CHCl_2 + IrCl_6^{2-} \rightarrow IrCl_5(H_2O)^{2-} + CHCl_3$	$\sim 5 \times 10^8$	4-6	295	p.r.	D.k. at 490 nm in soln. contg. chloroform.	82A041
11.20.4	**Permanganate ion**						
	$^{\bullet}CHCl_2 + MnO_4^- \rightarrow$	$\sim 1 \times 10^9$	4-6		p.r.	D.k. at 545 nm in N_2O-satd. soln. contg. chloroform.	82A041
11.20.5	**Ribonuclease**						
	$^{\bullet}CHCl_2 + RNase \rightarrow$	6×10^8	11		p.r.	P.b.k. in soln. contg. $CHCl_3$ and *tert*-BuOH.	731140
11.21	**1,2-Dichloro-1,2,2-trifluoroethyl**						
11.21.1	**Oxygen**						
	$CClF_2\dot{C}ClF + O_2 \rightarrow CClF_2CClFOO^{\bullet}$	1.6×10^9			p.r.	Eval. from leveling off of rate of reaction of peroxyl radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L^{-1} *tert*-BuOH and 1,1,2-trichloro-1,2,2-trifluoroethane; includes $CCl_2F\dot{C}F_2 + O_2 \rightarrow CCl_2FCF_2OO^{\bullet}$	88A364
11.22	***Dichlorovinyl***						
11.22.1	**Oxygen**						
	$^{\bullet}CCl{=}CHCl + O_2 \rightarrow CHCl{=}CClOO^{\bullet}$	4.3×10^9			p.r.	P.b.k. in Ar/O_2 (9:1) satd. soln. contg. trichloroethylene; radical mixture contains 25% $^{\bullet}CH{=}CCl_2$.	94A221
11.22.2	**Methanol**						
	$^{\bullet}CCl{=}CHCl + MeOH \rightarrow ClCH{=}CHCl + {}^{\bullet}CH_2OH$	6.3×10^5			p.r.	C.k. in Ar/O_2 (10:1) satd. soln. contg. trichloroethylene and MeOH; 8.4×10^6 L $mol^{-1}\ s^{-1}$ is also quoted; radical mixture contains 25% $^{\bullet}CH{=}CCl_2$; rel. to $k(^{\bullet}CCl{=}CHCl + O_2) = 4.3 \times 10^9$ L $mol^{-1}\ s^{-1}$.	94A221
11.22.3	**2-Propanol**						
	$^{\bullet}CCl{=}CHCl + 2\text{-}PrOH \rightarrow ClCH{=}CHCl + (CH_3)_2\dot{C}OH$	6.3×10^6			p.r.	C.k. in Ar/O_2 (10:1) satd. soln. contg. trichloroethylene and 2-PrOH; 8.4×10^6 L $mol^{-1}\ s^{-1}$ is also quoted; radical mixture contains 25% $^{\bullet}CH{=}CCl_2$; rel. to $k(^{\bullet}CCl{=}CHCl + O_2) = 4.3 \times 10^9$ L $mol^{-1}\ s^{-1}$.	*94A221*

TABLE 11. Miscellaneous haloalkyl and haloalkenyl radicals — *Continued*

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	T(K)	Method	Comment	Ref.
11.23	**Pentachloroethyl**						
11.23.1	**Oxygen**						
	$CCl_3\dot{C}Cl_2 + O_2 \rightarrow CCl_3CCl_2OO^{\bullet}$	2.1×10^9			p.r.	Eval. from leveling off of rate of reaction of peroxyl radical with ABTS, chlorpromazine, promethazine and propyl gallate at high concn. of substrates in air-satd. soln. ($[O_2] = 6.8 \times 10^{-4}$ mol L^{-1}) contg. 40% *tert*-BuOH and hexachloroethane.	88A364
11.24	**1,2,2-Tribromoethyl**						
11.24.1	**First-order reaction**						
	$CHBr_2\dot{C}HBr \rightarrow CHBr{=}CHBr + Br^{\bullet}$	$2.7 \times 10^5\ s^{-1}$			p.r.	Derived from buildup of $Br_2^{\bullet-}$ in N_2-satd. soln. contg. 40% *tert*-BuOH, 1,1,2,2-tetrabromoethane and bromide ion.	93A578
11.25	**2,2,2-Tribromoethyl**						
11.25.1	**First-order reaction**						
	$CBr_3\dot{C}H_2 \rightarrow CBr_2{=}CH_2 + Br^{\bullet}$	$1.2 \times 10^5\ s^{-1}$			p.r.	Derived from buildup of $Br_2^{\bullet-}$ in N_2-satd. soln. contg. 40% *tert*-BuOH, 1,1,1,2-tetrabromoethane and bromide ion; radical mixture with 1,1,2-tribromoethyl.	93A578
11.26	**Tribromomethyl**						
11.26.1	**Iron(III) deuteroporphyrin IX**						
	$^{\bullet}CBr_3 + Fe(III)DP \rightarrow$	$<10^6$	alk.		p.r.	No reaction in CBr_4 satd. soln. contg. 6.5 mol L^{-1} 2-PrOH.	87A232
11.27	**Trichlorovinyl**						
11.27.1	**Oxygen**						
	$CCl_2\dot{C}Cl + O_2 \rightarrow Cl_2C{=}CClOO^{\bullet}$	3.8×10^9			p.r.	P.b.k. at 580 nm in Ar/O_2 (9:1) satd. soln. contg. tetrachloroethylene.	94A221
11.27.2	**Methanol**						
	$CCl_2\dot{C}Cl + MeOH \rightarrow ClCH{=}CCl_2 + {}^{\bullet}CH_2OH$	2.9×10^6			p.r.	C.k. in Ar/O_2 (10:1) satd. soln. contg. tetrachloroethylene and MeOH; rel. to $k(^{\bullet}CCl{=}CCl_2 + O_2) = 3.8 \times 10^9$ L $mol^{-1}\ s^{-1}$.	94A221
11.27.3	**2-Propanol**						
	$CCl_2\dot{C}Cl$ + 2-PrOH $\rightarrow ClCH{=}CCl_2 + (CH_3)_2\dot{C}OH$	2.4×10^7			p.r.	C.k. in Ar/O_2 (10:1) satd. soln. contg. tetrachloroethylene and 2-PrOH; rel. to $k(^{\bullet}CCl{=}CCl_2 + O_2) = 3.8 \times 10^9$ L $mol^{-1}\ s^{-1}$.	94A221
11.27.4	**2-Methyl-2-propanol**						
	$CCl_2\dot{C}Cl$ + *tert*-BuOH $\rightarrow ClCH{=}CCl_2 + {}^{\bullet}CH_2C(CH_3)_2OH$	1.6×10^5			p.r.	C.k. in Ar/O_2 (10:1) satd. soln. contg. tetrachloroethylene and *tert*-BuOH; rel. to $k(^{\bullet}CCl{=}CCl_2 + O_2) = 3.8 \times 10^9$ L $mol^{-1}\ s^{-1}$.	94A221

TABLE 12. Hydroxymethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.1	**Hydroxymethyl**							
	$^{\bullet}CH_2OH + {}^{\bullet}CH_2OH \rightarrow$	1.5×10^9				p.r.	D.k. in N_2O-satd. soln. contg. MeOH; ε = 270 $L\ mol^{-1}\ cm^{-1}$ at 310 nm.	771011
		1.2×10^9	6			p.r.	D.k. at 280 nm, in N_2O-satd. soln. contg. MeOH; $2k/\varepsilon = 6.2 \times 10^6$ cm s^{-1}; $pK_a = 10.7$ [660074].	690419
12.2	**Hydroxymethyl, conjugate base**							
	$CH_2O^- + {}^{\bullet}CH_2O^- \rightarrow$	4.5×10^8	12			p.r.	D.k. at 350 nm, in N_2O-satd. soln. contg. MeOH; $2k/\varepsilon = 1.5 \times 10^6$ cm s^{-1}.	690419
12.3	**Silver(I) ion, complex with Ag(0**							
	$^{\bullet}CH_2OH + Ag_2^+ \rightarrow Ag_2CH_2OH^+$	5.0×10^9				p.r.	Calcd. from increase in condy. as function of time in soln. contg. 0.1 mol L^{-1} MeOH and 5×10^{-4} mol L^{-1} $AgClO_4$. Products are CH_2O and Ag_2.	78A410
12.4	**Silver(I) ion**							
	$^{\bullet}CH_2OH + Ag^+ \rightarrow$					p.r.	No reaction to give Ag^0 in soln. contg. 0.1 mol L^{-1} MeOH.	78A410
12.5	**Bismuth(III) ion**							
	$^{\bullet}CH_2OH + Bi^{3+} \rightarrow BiCH_2OH^{3+}$	4×10^5	<0			p.r.	P.b.k. at ~400 nm in Ar-satd. soln. contg. 5 mol L^{-1} $HClO_4$ and MeOH.	88A493
12.6	**Cadmium(I) ions**							
	$^{\bullet}CH_2OH + Cd^+ \rightarrow CdCH_2OH^+$	2×10^8				p.r.	D.k. at 300 nm (Cd^+) in soln. contg. MeOH and Cd^{2+}, as well as condy., and p.b.k. at 240 nm (Cd_2^{2+}); assumed $k(Cd^+ + H_2O_2) = 1.5 \times 10^9$, $k(R + R) = 1.2 \times 10^9$ $L\ mol^{-1}\ s^{-1}$.	751064
12.7	**Cadmium(II) ion**							
	$^{\bullet}CH_2OH + Cd^{2+} \rightarrow$	$<10^2$			298	p.r.	Estd. from lack of increase in Cd^+ in soln. contg. 0.1 mol L^{-1} Cd^{2+} upon addn. of 0.1 mol L^{-1} MeOH.	751027
12.8	**Cobalt(II) ion**							
	$^{\bullet}CH_2OH + Co^{2+} \rightarrow$	$<10^2$			298	p.r.	Estd. from lack of increase in Co^+ in soln. contg. 0.1 mol L^{-1} Co^{2+} upon addn. of 0.1 mol L^{-1} MeOH.	751027
12.9	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$^{\bullet}CH_2OH + N\text{-}rac\text{-}Co(4,11\text{-}dieneN_4)^{2+} \rightarrow HOCH_2Co(4,11\text{-}dieneN_4)^{2+}$	7×10^7	1-6			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	78A200
12.10	**(Nitrilotriacetato)cobaltate(II) ion**							
	$^{\bullet}CH_2OH + CoNTA^- \rightarrow HOCH_2CoNTA^-$	9.7×10^7 2.0×10^8 4.1×10^8	4-7		280 295 325	p.r.	P.b.k. at 260 nm in N_2O-satd. soln. contg. (1-50) $\times 10^{-4}$ mol L^{-1} CoNTA and 0.2-1 mol L^{-1} MeOH; $\Delta H\ddagger = 20.1$ kJ mol^{-1}, $\Delta S\ddagger = -19.2$ J K^{-1} mol^{-1}, studied at 280-328 K.	88A343
12.11	***N*-(Hydroxyethyl)ethylenediaminetriacetatocobaltate(II) ion**							
	$^{\bullet}CH_2OH + CoHEDTA^- \rightarrow HOCH_2CoHEDTA^-$	1.3×10^7			298	p.r.	P.b.k.	88A343
12.12	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion**							
	$^{\bullet}CH_2OH + CoTPPS^{4-} \rightarrow HOCH_2CoTPPS^{4-}$	1.1×10^9	8		294	p.r.	P.b.k. in N_2O-satd. soln. contg. 1.5 mol L^{-1} MeOH.	83A088

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
12.13	**3,10,17,24-Tetrasulfophthalocyaninecobaltate(II) ion dimer**							
	$^{\bullet}CH_2OH + [Co(tspc)]_2^{8-} \rightarrow$	2.2×10^8	9			p.r.	D.k. in N_2O-satd. soln. contg. 0.1-0.2 mol L^{-1} MeOH; mechanism suggested to involve ligand-radical formation, followed by metal redn. and dimer splitting to give $(Co^{I}tspc)^{5-}$.	80A146
12.14	**Hexaamminecobalt(III) ion**							
	$^{\bullet}CH_2OH + Co(NH_3)_6^{3+} \rightarrow HCHO + H^+ + Co(NH_3)_6^{2+}$	1.4×10^8	6.1			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	771100
		1.4×10^8	5.75					
		6×10^7	4.9					
		4.5×10^7	4.5					
		$\leq 1 \times 10^7$	3.5					
		1.4×10^8	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH.	72A018
	$^{\bullet}CH_2O^- + Co(NH_3)_6^{3+} \rightarrow HCHO + Co(NH_3)_6^{2+}$	9.0×10^9	12			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH.	72A018
12.15	**Pentaammine(aqua)cobalt(III) ion**							
	$^{\bullet}CH_2OH + Co(NH_3)_5(H_2O)^{3+} \rightarrow$ redn.	1.5×10^6	3.5-4			γ-r.	Calcd. from $G(Co^{2+})$, dose rate and $k(R + R) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	771100
12.16	**Pentaammine(bromo)cobalt(III) ion**							
	$^{\bullet}CH_2OH + Co(NH_3)_5Br^{2+} \rightarrow$	9.0×10^7	6.1			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	771100
		2.5×10^7	4.9					
		2.0×10^7	4.5					
		1.8×10^7	3.5					
		1.8×10^7	2.0					
		1.8×10^7	1.0					
12.17	**Pentaammine(chloro)cobalt(III) ion**							
	$^{\bullet}CH_2OH + Co(NH_3)_5Cl^{2+} \rightarrow$	3×10^6	3.5-4			γ-r	Estd. from effect of complex concn. on $G(Co^{2+})$ assuming $2k(R + R) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	771100
12.18	**Pentaammine(fluoro)cobalt(III) ion**							
	$^{\bullet}CH_2OH + Co(NH_3)_5F^{2+} \rightarrow$	5.5×10^5	3.5-4			γ-r.	Estd. from effect of complex concn. on $G(Co^{2+})$ assuming $2k(R + R) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	771100
12.19	**Tris(ethylenediamine)cobalt(III) ion**							
	$^{\bullet}CH_2OH + Co(en)_3^{3+} \rightarrow$	$<10^3$	2.5		298	chem.	Estd. in N_2-satd. soln. contg. 6.2×10^{-4} mol L^{-1} $CrCH_2C_6H_5^{2+}$, 6.4×10^{-4} mol L^{-1} H_2O_2 and 0.81-3.5 mol L^{-1} MeOH.	82A480
			3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. MeOH; no reaction.	771100
12.20	***cis*-Aquachlorobis(ethylenediamine)cobalt(III) ion**							
	$^{\bullet}CH_2OH + cis\text{-}Co(en)_2(H_2O)Cl^{2+} \rightarrow$	1.8×10^6	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	771100
12.21	***cis*-Amminechlorobis(ethylenediamine)cobalt(III) ion**							
	$^{\bullet}CH_2OH + cis\text{-}Co(en)_2(NH_3)Cl^{2+} \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	771100
12.22	***cis*-Bromobis(ethylenediamine)fluorocobalt(III) ion**							
	$^{\bullet}CH_2OH + Co(en)_2BrF^{+} \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	771100
12.23	***trans*-Dibromobis(ethylenediamine)cobalt(III) ion**							
	$^{\bullet}CH_2OH + Co(en)_2Br_2^{+} \rightarrow$	2.6×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	771100
12.24	***trans*-Dichlorobis(ethylenediamine)cobalt(III) ion**							
	$^{\bullet}CH_2OH + trans\text{-}Co(en)_2Cl_2^{+} \rightarrow$	8×10^6	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	771100

TABLE 12. Hydroxymethyl — Continued

Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.25 ***cis*-Dichlorobis(ethylenediamine)cobalt(III) ion**							
$^{\cdot}CH_2OH + cis\text{-}Co(en)_2Cl_2^+ \rightarrow$	$\leq 5 \times 10^6$	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	771100
12.26 **Bis(ethylenediamine)difluorocobalt(III) ion**							
$^{\cdot}CH_2OH + Co(en)_2F_2^+ \rightarrow$		3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. MeOH; no reaction.	771100
12.27 **Benzylbis(dimethylglyoximato)(pyridine)cobaltate(III)**							
$^{\cdot}CH_2O^- + C_6H_5CH_2Co(dmgH)_2(py) \rightarrow HCHO + C_6H_5CH_2Co(dmgH)_2(py)^-$	2×10^8	11.3			p.r.	P.b.k. at 700 nm in deoxygenated soln. contg. MeOH.	94A288
12.28 **Tris(2,2'-bipyridine)cobalt(III) ion**							
$^{\cdot}CH_2OH + Co(bpy)_3^{3+} \rightarrow HCHO + H^+ + Co(bpy)_3^{2+}$	2×10^8	1,7			p.r.	P.b.k. at 326 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} MeOH.	79A034
12.29 **Tris(1,10-phenanthroline)cobalt(III) ion**							
$^{\cdot}CH_2OH + Co(phen)_3^{3+} \rightarrow$ addn. to ligand	8×10^8	1-7			p.r.	P.b.k. at 475 nm in N_2O-satd. soln. contg. 2.5 mol L^{-1} MeOH.	80A227
	7×10^8	1-7			p.r.	C.k. in N_2O-satd. soln. contg. 2.5 mol L^{-1} MeOH; rel. to $k(^{\cdot}CH_2OH + O_2) = 4.2 \times 10^9$ L $mol^{-1}\ s^{-1}$.	80A227
12.30 **Tris(5,6-dimethyl-1,10-phenanthroline)cobalt(III) ion**							
$^{\cdot}CH_2OH + Co(5,6\text{-}Me_2phen)_3^{3+} \rightarrow HCHO + H^+ + Co(5,6\text{-}Me_2phen)_3^{2+}$	4.9×10^8	~7			p.r.	P.b.k., as well as d.k. at 380 nm in N_2O-satd. soln. contg. 2.5 mol L^{-1} MeOH.	80A227
12.31 **Decakis(cyano)-μ-superoxidodicobaltate(III) ion**							
$^{\cdot}CH_2OH + O_2[Co(CN)_5]_2^{5-} \rightarrow H^+ + O_2[Co(CN)_5]_2^{6-} + HCHO$	2.8×10^8	~5.0			p.r.	P.b.k. as well as d.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	81A009
12.32 **μ-Amido-μ-superoxidotetrakis(ethylenediamine)dicobalt(III) ion**							
$^{\cdot}CH_2OH + NH_2[Co(en)_2]_2(O_2)^{4+} \rightarrow H^+ + NH_2[Co(en)_2]_2(O_2)^{3+} + HCHO$	4×10^7	~5.0			p.r.	P.b.k. as well as d.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	81A009
12.33 **μ-Amido-μ-superoxidooctakisamminedicobalt(III) ion**							
$^{\cdot}CH_2OH + NH_2[Co(NH_3)_4]_2(O_2)^{4+} \rightarrow H^+ + NH_2[Co(NH_3)_4]_2(O_2)^{3+} + HCHO$	1.2×10^8	~5.0			p.r.	P.b.k. as well as d.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	81A009
12.34 **Chromium(II) ion**							
$^{\cdot}CH_2OH + Cr^{2+} \rightarrow CrCH_2OH^{2+}$	2×10^8	0-6.2			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.01-2 mol L^{-1} MeOH, $(1\text{-}20) \times 10^{-4}$ mol L^{-1} Cr^{2+} and $(9\text{-}100) \times 10^{-4}$ AcO^-/AcOH.	84A036
	1.6×10^8	~1			p.r.	P.b.k. in Ar-satd. soln. contg. MeOH and $HClO_4$.	741146
12.35 **1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
$^{\cdot}CH_2OH + Cr([15]aneN_4)^{2+} \rightarrow HOCH_2Cr([15]aneN_4)^{2+}$	1.2×10^8	4.4-5.3			p.r.	P.b.k. at 320 nm in N_2O-satd. soln. contg. $(0.2\text{-}11.0) \times 10^{-3}$ mol L^{-1} [15]aneN$_4$, $(0.16\text{-}1.0) \times 10^{-3}$ mol L^{-1} Cr^{2+}, 0-0.009 mol L^{-1} acetate and 1.0 mol L^{-1} MeOH.	85A499
12.36 ***cis*-Diaqua(nitrilotriacetato)chromate(II) ion**							
$^{\cdot}CH_2OH + cis\text{-}[CrNTA(H_2O)_2]^- \rightarrow cis\text{-}[HOCH_2CrNTA(H_2O)]^- + H_2O$	2.2×10^8	5.6			p.r.	P.b.k. at 325 nm in He-satd. soln. contg. 0.055 mol L^{-1} NTA, $(2\text{-}5) \times 10^{-4}$ mol L^{-1} Cr^{2+}, 0.009 mol L^{-1} acetate, 0.001 mol L^{-1} $Cr(NTA)(H_2O)_2$ and 2.2 mol L^{-1} MeOH.	85A499
12.37 **Copper(I) ion**							
$^{\cdot}CH_2OH + Cu^+ \rightarrow CuCH_2OH^+$	$\sim 6 \times 10^9$	4.0			p.r.	Estd. from growth and decay of absorption in soln. contg. MeOH and Cu^{2+}.	80A278

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.37	**Copper(I) ion** — *Continued*							
		$\sim 10^{10}$	4.5		298	p.r.	Estd. from growth and decay of absorption in soln. contg. MeOH and Cu^{2+}.	78A322
12.38	**Copper(II) ion**							
	$^{\bullet}CH_2OH + Cu^{2+} \rightarrow Cu^{+} + HCHO + H^{+}$	1.6×10^8	6			p.r.	D.k. at ~300 nm (radical) in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	80A277
		1.9×10^8	≤ 3		298	p.r.	D.k. at 240-300 nm (radical) in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	78A322
		1.6×10^8	2-5		298	p.r.	P.b.k. at 320 nm ($Cu^{I}CH_2CHCONH_2$) in soln. contg. MeOH and 0.01 mol L^{-1} acrylamide.	78A322
		1.1×10^8	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH.	72A018
12.39	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecopper(II) ion**							
	$^{\bullet}CH_2OH + Cu(4,11\text{-dieneN}_4)^{2+} \rightarrow Cu(4,11\text{-dieneN}_4)^{+} + HCHO + H^{+}$	$\leq 2 \times 10^6$	3.5-10			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH; product ident. with that from e_{aq}^{-}.	80A189
	$^{\bullet}CH_2O^{-} + Cu(4,11\text{-dieneN}_4)^{2+} \rightarrow Cu(4,11\text{-dieneN}_4)^{+} + HCHO$	9.0×10^8	12.0			p.r.	P.b.k. at 410 nm; no reduction obs. in neutral soln.; in methanolic soln. $k = 2.2 \times 10^4$ L $mol^{-1}\ s^{-1}$ was detd. by f.p. (p.b.k. at 415 nm).	761039
12.40	***cis*-Diaqua(nitrilotriacetato)copper(II) ion**							
	$^{\bullet}CH_2OH + cis\text{-}[Cu(NTA)(H_2O)_2]^{-} \rightarrow cis\text{-}[HOCH_2Cu(NTA)(H_2O)]^{-}$	1.9×10^8	5-8			p.r.	P.b.k. at 425 nm in N_2O-satd. soln. contg. $(1\text{-}100) \times 10^{-5}$ mol L^{-1} $CuSO_4$, 1×10^{-3} mol L^{-1} nitrilotriacetate ion and 0.1 mol L^{-1} MeOH.	86B151
12.41	**Copper(II) tetraglycine**							
	$^{\bullet}CH_2OH + Cu(Gly_4)^{2-} \rightarrow H^{+} + Cu(Gly_4)^{3-} + HCHO$	8.6×10^7	7.3-10			p.r.	D.k. at 290-330 nm in soln. contg. 1 mol L^{-1} MeOH.	80A304
12.42	**Iron(II) protoporphyrin**							
	$^{\bullet}CH_2OH + Fe(II)PP \rightarrow$ addn.	2.5×10^8	10.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2×10^{-5} mol L^{-1} Fe(II)PP and 0.1 mol L^{-1} methanol.	85A006
12.43	**Iron(III) ion**							
	$^{\bullet}CH_2OH + Fe^{3+} \rightarrow Fe^{2+} + HCHO + H^{+}$	8×10^7					Unpubl. data, C.N.Barnes and G.V.Buxton.	78A322
		1×10^8	~1			γ-r.	C.k.; obs. $C(NO_3)_3^{-}$ and Fe^{2+} yields; rel. to $k(^{\bullet}CH_2OH + C(NO_2)_4) = 5 \times 10^9$ L $mol^{-1}\ s^{-1}$.	77G411
12.44	**Pentacyano(nitrosyl)ferrate(III) ion**							
	$^{\bullet}CH_2OH + Fe(CN)_5(NO)^{2-} \rightarrow HCHO + H^{+} + Fe(CN)_5NO^{3-}$	6.0×10^8	8.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.5 mol L^{-1} MeOH.	771120
12.45	**Ferricyanide ion**							
	$^{\bullet}CH_2OH + Fe(CN)_6^{3-} \rightarrow HCHO + H^{+} + Fe(CN)_6^{4-}$	3.8×10^9	9		298	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH, 0.001 mol L^{-1} Na borate and $(1\text{-}2) \times 10^{-4}$ mol L^{-1} ferricyanide; $E_a = 4.8$ kJ mol^{-1}, studied at 293-353 K.	89A421
		4.2×10^9	~5			p.r.	Condy. changes in N_2O-satd. soln. contg. MeOH.	700254
		4.0×10^9	7			p.r.	D.k. at 410 nm (ferricyanide) in soln. contg. MeOH.	680308 690522
	$^{\bullet}CH_2O^{-} + Fe(CN)_6^{3-} \rightarrow HCHO + Fe(CN)_6^{4-}$	3.1×10^9	13			p.r.	D.k. at 410 nm (ferricyanide) in soln. contg. MeOH.	680308
12.46	**Diethylenetriaminepentaacetatoferrate(III) ion**							
	$^{\bullet}CH_2OH + FeDTPA^{2-} \rightarrow$	3.8×10^8	11.0			p.r.	D.k.; no intermediate detected, reduction to Fe(II).	89A135

TABLE 12. Hydroxymethyl — Continued

Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
12.47 Tris(1,10-phenanthroline)iron(III) ion							
$^{\cdot}CH_2OH + Fe(phen)_3^{3+} \rightarrow$	5×10^9	~1			p.r.	P.b.k. at 490 nm in soln. contg. 0.1-1 mol L^{-1} MeOH and $(0.4\text{-}1.0) \times 10^{-4}$ mol L^{-1} complex; outer-sphere electron transfer.	85A284
12.48 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatoferrate(III) ion							
$^{\cdot}CH_2OH + FeTPPS^{3-} \rightarrow HCHO + FeTPPS^{4-} + H^+$	8.1×10^8 8.4×10^8	3.2 5.3			p.r.	Condy. buildup as well as p.b.k. at 550 nm in soln. contg. 0.1 mol L^{-1} MeOH.	91A186
12.49 Dihydroxytetrakis(4-sulfonatophenyl)porphinatoferrate(III)-β-cyclodextrin complex							
$^{\cdot}CH_2OH + FeTPPS(OH)_2(CD)_4^{5-} \rightarrow HCHO + FeTPPS(OH)(H_2O)(CD)_4^{5-}$	6.1×10^8	10.2			p.r.	P.b.k. at 550 nm in soln. contg. 0.1 mol L^{-1} MeOH and 0.001 mol L^{-1} β-cyclodextrin.	91A186
12.50 5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatoiron(III) ion							
$^{\cdot}CH_2OH + FeTMpyP^{5+} \rightarrow HCHO + H^+ + FeTMpyP^{4+}$	8.5×10^8	8.5-9.5			p.r.	D.k. at 497 nm, as well as p.b.k. at 562 nm, in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH.	91A380
	1.4×10^9 9×10^8	5.6 8.1			p.r.	D.k. at 420 as well as p.b.k. at 445 and 560 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	82A119
12.51 Dicyanotetrakis(1-methylpyridinium-4-yl)porphineiron(III) ion							
$^{\cdot}CH_2OH + FeTMpyP(CN)_2^{3+} \rightarrow HCHO + H^+ + FeTMpyP(CN)_2^{2+}$	1.2×10^9	10.1			p.r.	D.k. at 435 as well as p.b.k. at 470 nm in soln. contg. 0.002 mol L^{-1} KCN and $(1\text{-}5) \times 10^{-5}$ mol L^{-1} Fe^{III} complex.	82A119
12.52 α,α,α,β-Tetrakis(*N*-methylisonicotinamidophenyl)porphinatoiron(III) ion							
$^{\cdot}CH_2OH + FePFP^{5+} \rightarrow FePFP^{4+} + H^+ + HCHO$	2.2×10^9 1.2×10^9	5.8 7.9			p.r.	D.k. at 420 nm (Fe^{III} complex) as well as p.b.k. at 440 nm (Fe^{II} complex) in soln. contg. $(5\text{-}50) \times 10^{-6}$ mol L^{-1} Fe^{III} complex.	86A154
12.53 Dicyano-α,α,α,β-tetrakis(*N*-methylisonicotinamidophenyl)porphinatoiron(III) ion							
$^{\cdot}CH_2OH + FePFP(CN)_2^{3+} \rightarrow FePFP(CN)_2^{2+} + H^+ + HCHO$	1.5×10^9	10.2			p.r.	D.k. at 420 nm (Fe^{III} complex) as well as p.b.k. at 440 nm (Fe^{II} complex) in soln. contg. $(10\text{-}50) \times 10^{-6}$ mol L^{-1} Fe^{III} complex, 10^{-3} mol L^{-1} carbonate, 5×10^{-4} mol L^{-1} KCN.	86A154
12.54 Bis(1-methylimidazole)-α,α,α,β-tetrakis(*N*-methylisonicotinamidophenyl)porphinatoiron(III) ion							
$^{\cdot}CH_2OH + FePFP(1\text{-}MeIm)_2^{5+} \rightarrow FePFP(1\text{-}MeIm)_2^{4+} + H^+ + HCHO$	1.3×10^9	5.8-7.9			p.r.	P.b.k. at 434 nm (Fe^{II} complex) in N_2O-satd. soln. contg. $(5\text{-}50) \times 10^{-6}$ mol L^{-1} Fe^{III} complex, and 3.4×10^{-2} mol L^{-1} ligand (pK_a 1-MeIm = 7.0).	86A154
12.55 Gallium(II) ions							
$^{\cdot}CH_2OH + Ga^{2+} \rightarrow HCHO + H^+ + Ga^+$	1.1×10^9	2.3	→0		p.r.	D.k. in soln. contg. MeOH; Ga(II) formed from e_{aq}^- + Ga(III).	79A190
12.56 Hydroxygallium(II) ion							
$^{\cdot}CH_2OH + GaOH^+ \rightarrow HCHO + H_2O + Ga^+$	1.0×10^9	2.9	→0		p.r.	D.k. in soln. contg. MeOH; Ga(II) formed from e_{aq}^- + Ga(III).	79A190
12.57 Hexahydroxygallate(II) ion							
$^{\cdot}CH_2O^- + Ga(OH)_6^{4-} \rightarrow$	7.8×10^8	12.0	→0		p.r.	D.k. in soln. contg. MeOH; Ga(II) formed from e_{aq}^- + Ga(III).	79A190
12.58 Hydrogen ion							
$^{\cdot}CH_2OH + H^+ \rightarrow {}^{\cdot}CH_2OH_2^+$	3.2×10^7			303	chem.	Esr study in soln. contg. Ti(III), H_2O_2 and MeOH; $\log A = 9.5$, $E_a = 12$ kJ mol^{-1}, studied at 279-314 K.	689058
	3.6×10^7				phot.	Esr study in soln. contg. 10% acetone and 5% MeOH.	66D162

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
12.58	**Hydrogen ion** — Continued							
		1.8×10^8				chem.	Esr study in soln. contg. Ti(III), H_2O_2 and MeOH.	655040
12.59	**Mercury(I) cyanide**							
	$^{\cdot}CH_2OH + HgCN \rightarrow$	4.0×10^9				p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. MeOH and $Hg(CN)_2$; used $2k(HgCN + HgCN) = 3.4 \times 10^9$ L mol^{-1} s^{-1}.	751203
12.60	**Indium(II) ion**							
	$^{\cdot}CH_2OH + In^{2+} \rightarrow$	1.9×10^9	1.5-2.2			p.r.	D.k. (In^{2+}) in Ar-satd. soln. contg. ~0.1 mol L^{-1} MeOH and (0.2-2) $\times 10^{-3}$ mol L^{-1} In^{3+}.	83A206
12.61	**Indium(III) ion**							
	$^{\cdot}CH_2OH + In^{3+} \rightarrow$	$<5 \times 10^4$	2			p.r.	No reaction obs.	83A206
12.62	**Hexachloroiridate(IV) ion**							
	$^{\cdot}CH_2OH + IrCl_6^{2-} \rightarrow HCHO + H^+ + IrCl_6^{3-}$	6.0×10^9	4-6			p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. MeOH.	82A041
12.63	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion**							
	$^{\cdot}CH_2OH + MnTMpyP^{5+} \rightarrow HCHO + H^+ + MnTMpyP^{4+}$	2.1×10^9	6.7-9.3			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
12.64	**5,10,15,20-Tetrakis[4-(*N,N,N*-trimethylammonio)phenyl]porphinatomanganese(III) ion**							
	$^{\cdot}CH_2OH + MnTAPP^{5+} \rightarrow HCHO + H^+ + MnTAPP^{4+}$	2.0×10^9	6.7			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
12.65	**α,α,α,β-Tetrakis[2-(*N*-methylisonicotinamido)phenyl]porphinatomanganese(III) ion**							
	$^{\cdot}CH_2OH + MnPFP^{5+} \rightarrow HCHO + H^+ + MnPFP^{4+}$	1.0×10^9	7.0			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
12.66	**18-Molybdodiphosphate ion(6-)**							
	$^{\cdot}CH_2OH + P_2Mo_{18}O_{62}^{6-} \rightarrow HP_2Mo_{18}O_{62}^{6-} + HCHO$	3.7×10^9	2		295	p.r.	P.b.k. in N_2O-satd. (2.5×10^{-2} mol L^{-1}) soln. contg. 0.5 mol L^{-1} MeOH and ~10^{-4} mol L^{-1} heteropolymolybdophosphate.	82A107
12.67	**Nickel(I) ion**							
	$^{\cdot}CH_2OH + Ni^+ \rightarrow NiCH_2OH^+$	4.2×10^9				p.r.	D.k. at 300 nm (as well as p.b.k. at 250 nm) in soln. contg. $NiSO_4$ and MeOH; used $G(Ni^+) = G(R) = 3.2$.	741037
12.68	**Nickel(II) ion**							
	$^{\cdot}CH_2OH + Ni^{2+} \rightarrow$	$<10^2$			298	p.r.	Estd. from lack of increase in Ni^+ in soln. contg. 0.1 mol L^{-1} Ni^{2+} on addn. of 0.1 mol L^{-1} MeOH.	751027
12.69	**3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonickel(IV) ion**							
	$^{\cdot}CH_2OH + Ni^{IV}L^{2+} \rightarrow HCHO + H^+ + [Ni^{III}L]^+$	3.5×10^9	2.5		294	p.r.	P.b.k. at 500 or 430 nm in N_2O-satd. soln. contg. MeOH.	85A354
12.70	**Hydrogen peroxide**							
	$^{\cdot}CH_2OH + H_2O_2 \rightarrow HCHO + H_2O + {}^{\cdot}OH$	1.8×10^5	6.8			γ-r.	Steady state; obs. $G(H_2O_2)$ in N_2O-satd. soln. contg. MeOH.	87G036
		2.3×10^4				chem.	Calcd. from esr of Ti(III)-H_2O_2 soln. contg. MeOH and *tert*-BuOH; used $2k(R + R) = 2 \times 10^9$ L mol^{-1} s^{-1}.	745144
		4.0×10^4				γ-r.	Calcd. from dose rate effect on H_2O_2 redn. in soln. contg. 0.99 mol L^{-1} MeOH; used $2k(R + R) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	700338

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.71	**Oxygen**							
	$^{\bullet}CH_2OH + O_2 \rightarrow HOCH_2OO^{\bullet}$	4.2×10^9	10.7			p.r.	P.b.k. at 248 nm (O_2^- formn.) in N_2O/O_2 satd. soln. contg. MeOH.	741099
		4.9×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.1 mol L^{-1} MeOH and ferricyanide; rel. to $k(R + Fe(CN)_6^{3-}) = 4.0 \times 10^9$ L $mol^{-1}\ s^{-1}$.	690522
12.72	**Lead(I) ions**							
	$^{\bullet}CH_2OH + Pb^+ \rightarrow PbCH_2OH^+$	2.9×10^9				p.r.	D.k. at 300 nm (Pb^+) in soln. contg. Pb^{2+} and MeOH, knowing initial [R] and [Pb^+]; cor. for k(R + R).	761170
12.73	**Palladium(II) ion**							
	$^{\bullet}CH_2OH + Pd^{2+} \rightarrow PdCH_2OH^+ \rightarrow Pd^+ + H^+ + HCHO$	3.5×10^7	0			p.r.	P.b.k. at 290 nm in soln. contg. 0.1-1 mol L^{-1} MeOH, (5-30) $\times 10^{-5}$ mol L^{-1} Pd^{2+} and 1 mol L^{-1} $HClO_4$.	94A518
		2.1×10^7	0			p.r.	P.b.k. at 290 nm in soln. contg. MeOH and (5-30) $\times 10^{-5}$ mol L^{-1} Pd^{2+} and 1 mol L^{-1} $HClO_4$.	94A210
12.74	**Dichlorobis(ethylenediamine)platinum(IV) ion**							
	$^{\bullet}CH_2OH + Pt(en)_2Cl_2^{2+} \rightarrow$ redn.	6.9×10^8	7			p.r.	P.b.k. at 240-340 nm in N_2O-satd. soln. contg. 1-4 mol L^{-1} MeOH.	751188
12.75	**Tris(2,2'-bipyridine)rhodium(III) ion**							
	$^{\bullet}CH_2OH + Rh(bpy)_3^{3+} \rightarrow$	~2×10^8				p.r.	P.b.k.; reaction involves addn. of radical to ligand, at least in part.	81A134
		2.2×10^8	7			p.r.	P.b.k.	741167
12.76	**Tris(1,10-phenanthroline)rhodium(III) ion**							
	$^{\bullet}CH_2OH + Rh(phen)_3^{3+} \rightarrow$ addn. to ligand	4×10^8				p.r.	P.b.k. at 475 nm in N_2O-satd. soln. contg. 2.5 mol L^{-1} MeOH.	80A227
12.77	**Dihydroxy-5,10,15,20-tetrakis(4-sulfonatophenyl)porphinerhodate(III) ion**							
	$^{\bullet}CH_2O^- + RhTPPS(OH)_2^{5-} \rightarrow RhTPPS(OH)_2^{6-} + HCHO$	1.6×10^8	13			p.r.	N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	85A114
12.78	**Tris(2,2'-bipyridine)ruthenium(II) ion**							
	$^{\bullet}CH_2OH + Ru(bpy)_3^{2+} \rightarrow$	$<10^6$	7			p.r.	No reduction.	78A068
	$^{\bullet}CH_2O^- + Ru(bpy)_3^{2+} \rightarrow HCHO + Ru(bpy)_3^+$	1.6×10^9	13	0.1		p.r.	P.b.k. at 510 nm in N_2O-satd. soln. contg. MeOH.	91A218
		2.9×10^9	11-13			p.r.	P.b.k.	78A068
12.79	**Tris(1,10-phenanthroline)ruthenium(II) ion**							
	$^{\bullet}CH_2O^- + Ru(phen)_3^{2+} \rightarrow HCHO + Ru(phen)_3^+$	5.2×10^9	11			p.r.	P.b.k. in N_2O-satd. soln. contg. 2.5 mol L^{-1} MeOH.	80A227
12.80	**Hexaammineruthenium(III) ion**							
	$^{\bullet}CH_2OH + Ru(NH_3)_6^{3+} \rightarrow HCHO + H^+ + Ru(NH_3)_6^{2+}$	4.1×10^7	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH.	72A018
12.81	**Pentaammine(chloro)ruthenium(III) ion**							
	$^{\bullet}CH_2OH + Ru(NH_3)_5Cl^{2+} \rightarrow$	1.2×10^8	3.4-5			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} methanol.	771100
12.82	**Hydrogen sulfide**							
	$^{\bullet}CH_2OH + H_2S \rightarrow H_2\dot{S}CH_2OH$		6			p.r.	P.b.k. at 360 nm; k(adduct $\rightarrow$ MeOH + $^{\bullet}SH$) = $2.3 \times 10^5\ s^{-1}$.	670262

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.83	**Hydrogen peroxomonosulfate ion**							
	$^{\bullet}CH_2OH + HSO_5^- \rightarrow$	1.8×10^6				chem.	Esr study in soln. contg. Ti(III) sulfate, H_2O_2, HSO_5^- and MeOH.	90D226
12.84	**Peroxodisulfate ion**							
	$^{\bullet}CH_2OH + S_2O_8^{2-} \rightarrow HCHO + H^+ + SO_4^{\bullet-} + SO_4^{2-}$	$\sim 7 \times 10^4$			273	γ-r.	Derived from product anal. in soln. contg. peroxodisulfate and MeOH by computer simulation.	88G043
		1.3×10^5			~293	chem.	Esr study in soln. contg. 0.008 mol L^{-1} Ti(III), 0.01 mol L^{-1} H_2O_2, (0-0.025) mol L^{-1} $S_2O_8^{2-}$ and ~0.01 mol L^{-1} MeOH.	84D044
12.85	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatotin(IV) ion**							
	$^{\bullet}CH_2O^- + SnTMpyP^{6+} \rightarrow HCHO + [SnTMpyP]^{\bullet 5+}$	6×10^9	13			p.r.	P.b.k. at 700 nm in soln. contg. MeOH.	84A121
12.86	**Titanium(III)**							
	$^{\bullet}CH_2OH + Ti(III) \rightarrow$					p.r.	No reaction in soln. contg. 1 mol L^{-1} MeOH and 0.01 mol L^{-1} Ti(III).	731057
12.87	**Thallium(I) ion**							
	$^{\bullet}CH_2O^- + Tl^+ \rightarrow Tl^0 + HCHO$	1.5×10^4	12	0.2		p.r.	P.b.k. at 325, 420 and 450 nm in soln. contg. 0.001 mol L^{-1} formaldehyde, 0.5 mol L^{-1} MeOH, 0.19 mol L^{-1} Tl^+ and $[OH^-] = 0.01$ mol L^{-1}.	89C001
12.88	**Thallium(I) ion, complex with Tl(0)**							
	$^{\bullet}CH_2OH + Tl_2^+ + H^+ \rightarrow MeOH + 2\ Tl^+$	4.0×10^9	6			p.r.	Calcd. from d.k. at 420 nm. and condy. changes in soln. contg. alcohol and Tl^+ assuming values for $2k(Tl_2^+ + Tl_2^+)$, $k(Tl_2^+ + H_2O_2)$ and $2k(R + R)$.	80A123
12.89	**Uranium(III) ion**							
	$^{\bullet}CH_2OH + U^{3+} \rightarrow$	$\leq 2 \times 10^7$	0.3			p.r.	D.k. at 350 nm in He-satd. soln. contg. 0.5 mol L^{-1} $HClO_4$ and 0.1-1 mol L^{-1} MeOH.	85A122
12.90	**Uranyl(VI) ion**							
	$^{\bullet}CH_2OH + UO_2^{2+} \rightarrow HCHO + H^+ + UO_2^+$	$\leq 4 \times 10^7$				p.r.	D.k. in N_2O-satd. soln. contg. MeOH.	89A327
12.91	**12-Tungstate ion(6-), dihydrogen**							
	$^{\bullet}CH_2OH + H_2W_{12}O_{40}^{6-} \rightarrow HCHO + H^+ + H_2W_{12}O_{40}^{7-}$	$\leq 1.3 \times 10^7$	5-6			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. MeOH.	82A271
12.92	**12-Tungstoferrate ion(5-)**							
	$^{\bullet}CH_2OH + FeW_{12}O_{40}^{5-} \rightarrow HCHO + H^+ + FeW_{12}O_{40}^{6-}$	2.2×10^8	5-6			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. MeOH.	82A271
12.93	**12-Tungstophosphate ion(3-)**							
	$^{\bullet}CH_2OH + PW_{12}O_{40}^{3-} \rightarrow HCHO + H^+ + PW_{12}O_{40}^{4-}$	2.2×10^9	~1			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. MeOH and $HClO_4$.	82A271
12.94	**Diphosphooctadecatungstate ion(6-)**							
	$^{\bullet}CH_2OH + P_2W_{18}O_{62}^{6-} \rightarrow P_2W_{18}O_{62}^{7-} + H^+ + HCHO$	2.6×10^9	2		295	p.r.	P.b.k. in N_2O-satd. (2.5×10^{-2} mol L^{-1}) soln. contg. 0.5 mol L^{-1} MeOH and $\sim 10^{-4}$ mol L^{-1} heteropolytungstophosphate.	82A107
		$\sim 10^9$	1.5			p.r.	P.b.k. in deaerated soln. contg. 0.1 mol L^{-1} MeOH.	81A385

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.95	**12-Tungstosilicate ion(4-)**							
	$^{\cdot}CH_2OH + SiW_{12}O_{40}^{4-} \rightarrow HCHO + H^+ + SiW_{12}O_{40}^{5-}$	9.1×10^8	5-6			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. MeOH.	82A271
12.96	**Zinc(I) ion**							
	$^{\cdot}CH_2OH + Zn^+ + H^+ \rightarrow Zn^{2+} + MeOH$	2.5×10^9	7		295	p.r.	Calcd. from d.k. at 310 nm (Zn^+) in N_2O-satd. soln. contg. MeOH and $ZnSO_4$; used $k(Zn^+ + Zn^+) = 4.5 \times 10^8$, $k(Zn^+ + H_2O_2) = 2.4 \times 10^9$, $k(Zn^+ + N_2O) = 1.6 \times 10^7$ and $k(R + R) = 1.5 \times 10^9$ L mol^{-1} s^{-1}.	771011
12.97	**Zinc(II) ion**							
	$^{\cdot}CH_2OH + Zn^{2+} \rightarrow$	$<10^2$			298	p.r.	Estd. from lack of increase in Zn^+ in soln. contg. 0.1 mol L^{-1} Zn^{2+} upon addn. of 0.1 mol L^{-1} MeOH.	751027
12.98	**Acridinium**							
	$^{\cdot}CH_2OH + AcH^+ \rightarrow$	5.0×10^8	2.0			p.r.	P.b.k. in N_2O-satd. soln. contg. MeOH; ~30% e-transfer; no reaction at pH 7.6; $pK_a = 5.6$.	741127
12.99	**Acrylamide**							
	$^{\cdot}CH_2OH + H_2C{=}CHCONH_2 \rightarrow$ addn.	2.6×10^7	2-5		298	p.r.	C.k. in N_2O-satd. soln. contg. MeOH and Cu^{2+}; rel. to $k(^{\cdot}CH_2OH + Cu^{2+}) = 1.6 \times 10^8$ L mol^{-1} s^{-1}.	78A322
12.100	**Acrylate ion**							
	$^{\cdot}CH_2OH + CH_2{=}CHCO_2^- \rightarrow$ addn.	5×10^5	~9			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and MeOH; calcd. using $2k(R + R) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	93D265
12.101	**Acrylic acid**							
	$^{\cdot}CH_2OH + H_2C{=}CHCO_2H \rightarrow$ addn.	9.5×10^6	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and MeOH; calcd. using $2k(R + R) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	93D265
		8.1×10^6	1			Fenton	rel. to $k(^{\cdot}CH_2OH + Fe^{3+}) = 1.0 \times 10^8$ L mol^{-1} s^{-1}.	739341
12.102	**Adenine, conjugate acid**							
	$^{\cdot}CH_2OH + AH^+ \rightarrow$ addn.	4.8×10^6	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. MeOH.	94A368
12.103	**Adenosine, conjugate acid**							
	$^{\cdot}CH_2OH + AH^+ \rightarrow$ addn.	$\sim 3 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. MeOH.	94A368
12.104	**Ascorbate ion**							
	$^{\cdot}CH_2OH + AH^- \rightarrow$	$<10^6$	11			p.r.	No reaction in soln. contg. 8.4×10^{-4} mol L^{-1} ascorbate and 0.025 mol L^{-1} MeOH.	771036
12.105	**Azobenzene**							
	$^{\cdot}CH_2O^- + C_6H_5N{=}NC_6H_5 \rightarrow HCHO + [C_6H_5N{=}NC_6H_5]^{\cdot -}$	1×10^9	14			p.r.	P.b.k. at 380 nm in soln. contg. MeOH; k same for *syn*- and *anti*- isomers.	771169
12.106	**Benzophenone**							
	$^{\cdot}CH_2O^- + (C_6H_5)_2CO \rightarrow HCHO + (C_6H_5)_2\dot{C}O^-$	1.2×10^8	13			p.r.	P.b.k. at 610 nm in N_2O-satd. soln. 1 mol L^{-1} MeOH.	751125

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.107	**1,4-Benzoquinone**							
	$^{\bullet}CH_2OH + Q \rightarrow HCHO + H^+ + Q^{\bullet-}$	2.9×10^9				γ-r.	C.k. in soln. contg. 1 mol L^{-1} H_2SO_4, 1.5×10^{-4} mol L^{-1} benzoquinone and 1 mol L^{-1} MeOH with varied $[O_2]$; rel. to $k(^{\bullet}CH_2OH + O_2) = 4.2 \times 10^9$ L mol^{-1} s^{-1}.	86G034
		4.8×10^9	6.2			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	730049
		6.1×10^9				p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	710619
12.108	**Biacetyl**							
	$^{\bullet}CH_2OH + CH_3COCOCH_3 \rightarrow HCHO + H^+ + [CH_3COCOCH_3]^{\bullet-}$	6.5×10^7	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH.	72A018
		1.1×10^8				p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH.	680249
12.109	**2,2'-Bipyridine**							
	$^{\bullet}CH_2OH + bpy \rightarrow$	$<10^6$	7			p.r.	P.b.k.; no reaction.	79A148
	$^{\bullet}CH_2O^- + bpy \rightarrow$	$<10^6$	alk.			p.r.	P.b.k.; no reaction.	79A148
12.110	**Carbon tetrachloride**							
	$^{\bullet}CH_2OH + CCl_4 \rightarrow {}^{\bullet}CCl_3 + Cl^- + HCHO + H^+$	$\leq 10^6$				p.r.	Condy. changes; $G(Cl^-) \approx 0.3G(^{\bullet}CH_2OH)$.	710778
12.111	**3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy**							
	$^{\bullet}CH_2OH + NX\text{-}s \rightarrow$ addn.	4.6×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	761152
12.112	**3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy**							
	$^{\bullet}CH_2OH + NX\text{-}u \rightarrow$ addn.	3.5×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	761152
12.113	**4-Carboxy-1-methylpyridinium**							
	$^{\bullet}CH_2O^- + 4\text{-}py^+(CH_3)CO_2^- \rightarrow$	3.8×10^9	12.7			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	79A051
12.114	**4-Chlorobenzenediazonium cation**							
	$^{\bullet}CH_2OH + 4\text{-}ClC_6H_4N_2^+ \rightarrow 4\text{-}ClC_6H_4 + HCHO + N_2 + H^+$	4.2×10^9	4			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH and $HClO_4$.	81A297
12.115	**Crotonic acid**							
	$^{\bullet}CH_2OH + CH_3CH{=}CHCO_2H \rightarrow$ addn.	4×10^5	−2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and MeOH; calcd. using $2k(R + R) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	*93D265*
12.116	**4-Cyanophenyl-*N*-*tert*-butylnitrone**							
	$^{\bullet}CH_2OH + 4\text{-}CN\text{-}PBN \rightarrow$	7.5×10^8				p.r.	C.k. in N_2O-satd. soln. contg. *p*-nitroacetophenone and MeOH; rel. to $k(^{\bullet}CH_2OH + PNAP) = 1 \times 10^8$ L mol^{-1} s^{-1}.	82A184
12.117	**Cysteamine, conjugate acid**							
	$^{\bullet}CH_2OH + H_3N^+CH_2CH_2SH \rightarrow MeOH + H_3N^+CH_2CH_2S^{\bullet}$	6.5×10^7	4			p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. MeOH, cysteamine and $ABTS^{2-}$; the latter reacts with $RS^{\bullet}$ to give $ABTS^{\bullet-}$ which is observed.	82Z335
		2.9×10^7	7			p.r.	D.k. in N_2O-satd. soln. contg. MeOH; ESR gating technique.	723003
		6.8×10^7 1×10^7	7.6 12			p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. MeOH; $pK_a = 8.27, 10.53$.	680132

TABLE 12. Hydroxymethyl — Continued

No. Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.118 Cysteine							
$^{\bullet}CH_2OH + CysSH \rightarrow MeOH + CysS^{\bullet}$	1×10^8				p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. MeOH, cysteine and $ABTS^{2-}$; the latter reacts with $RS^{\bullet}$ to give $ABTS^{\bullet-}$ which is observed.	82Z335
	4.2×10^7	7			p.r.	D.k. in N_2O-satd. soln. contg. MeOH; esr gating technique.	723003
12.119 2'-Deoxyadenosine, conjugate acid							
$^{\bullet}CH_2OH + dAH^+ \rightarrow$ addn.	5.5×10^6	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. MeOH.	94A368
12.120 2'-Deoxyguanosine, conjugate acid							
$^{\bullet}CH_2OH + dGH^+ \rightarrow$ addn.	$\sim 4 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. MeOH.	94A368
12.121 1,6-Diazabicyclo[4.4.4]tetradecane radical cation							
$^{\bullet}CH_2OH + DABCT^{\bullet+} \rightarrow$ H abstr.	1.5×10^9	~4			p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol MeOH and $(0.2\text{-}12) \times 10^{-4}$ mol L^{-1} radical cation; 100% H abstr.; product analysis supported by condy. measurements.	86A272
12.122 3,5-Dibromo-4-nitrosobenzenesulfonate ion							
$^{\bullet}CH_2OH + DBNBS \rightarrow$	2.6×10^8	8.0-8.5			p.r.	C.k.; rel. to $k(^{\bullet}CH_2OH + H_2TPPS^{4-}) = 1.1 \times 10^8$ L $mol^{-1}\ s^{-1}$.	92A304
12.123 2,6-Dichloroindophenolate ion							
$^{\bullet}CH_2OH + DCIP^- \rightarrow HCHO + H^+ + DCIP^{\bullet 2-}$	3.2×10^9	7			p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. MeOH; 99% e-transfer.	731078
12.124 1,4-Dicyanobenzene							
$^{\bullet}CH_2OH + DCNB \rightarrow HCHO + H^+ + [DCNB]^{\bullet-}$	1.4×10^8	~7			p.r.	P.b.k. at 345 nm in N_2O-satd. soln. contg. MeOH.	91A229
12.125 (*E*)-4,5-Dihydroxy-1,2-dithiane							
$^{\bullet}CH_2O^- + [SSCH_2(CHOH)_2CH_2] \rightarrow HCHO + [\dot{S}^-SCH_2(CHOH)_2CH_2]$	1.5×10^8 2.4×10^8 3.2×10^8	13.5		273 298 333	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. $(1\text{-}10) \times 10^{-4}$ mol L^{-1} DTT-ox and 0.1-0.5 mol L^{-1} methanol; mechanism suggested to be addn. followed by decomp. to radical anion.	89A167
$^{\bullet}CH_2OH + [SSCH_2(CHOH)_2CH_2] \rightarrow HCHO + H^+ + [\dot{S}^-SCH_2(CHOH)_2CH_2]$	1.1×10^8	10.8			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} MeOH.	86A363
12.126 Dihydroxymethane							
$^{\bullet}CH_2OH + CH_2(OH)_2 \rightarrow MeOH + {}^{\bullet}CH(OH)_2$	3.4×10^3				γ-r.	Estd. from product anal.	90G138
	$\sim 10^4\text{-}10^5$				γ-r.	Estd. from dose effects on yields in soln. contg. MeOH.	710929
12.127 3,3-Dimethylacrylic acid							
$^{\bullet}CH_2OH + (CH_3)_2C{=}CHCO_2H \rightarrow$ addn.	9×10^4	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and MeOH; *calcd. using* $2k(R + R) = 2.4 \times 10^9$ L $mol^{-1}\ s^{-1}$.	93D265
12.128 4-(*N,N*-Dimethylamino)benzenediazonium cation							
$^{\bullet}CH_2OH + 4\text{-}(CH_3)_2NC_6H_4N_2^+ \rightarrow HCHO + 4\text{-}(CH_3)_2NC_6H_4 + N_2 + H^+$	$< 4 \times 10^6$	4			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH and $HClO_4$.	81A297

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
12.129	**1,1'-Dimethyl-4,4'-bipyridinium**							
	$^{\bullet}CH_2OH + MV^{2+} \rightarrow HCHO + H^+ + MV^{\bullet+}$	3×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 3% MeOH.	771177
12.130	***N,N*-Dimethyl-4-nitrosoaniline**							
	$^{\bullet}CH_2OH + 4\text{-}Me_2NC_6H_4NO \rightarrow$	2.7×10^8				p.r.	D.k. in N_2O-satd. soln. contg. 4.9 mol L^{-1} MeOH and $(1\text{-}5) \times 10^{-5}$ mol L^{-1} *N,N*-dimethyl-4-nitrosoaniline.	94A511
		7.9×10^8	7			p.r.	D.k. at 440 nm in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	690156
12.131	**1,3-Dimethyluracil**							
	$^{\bullet}CH_2OH + 1,3\text{-DMU} \rightarrow [1,3\text{-DMU-6-}CH_2OH]^{\bullet}$	$\sim 10^4$				γ-r.	Estd. in N_2O-satd. soln. contg. 0.5 mol L^{-1} MeOH and 0.001 mol L^{-1} dimethyluracil.	86G178
12.132	**1,4-Dinitrobenzene**							
	$^{\bullet}CH_2OH + 1,4\text{-}C_6H_4(NO_2)_2 \rightarrow HOCH_2ON(\dot{O})C_6H_4\text{-}4\text{-}NO_2$	2.0×10^8	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
	$^{\bullet}ClI_2O^- + 1,4\text{-}C_6H_4(NO_2)_2 \rightarrow HClIO + [1,4\text{-}C_6H_4(NO_2)_2]^{\bullet-}$	$\sim 3 \times 10^9$	~11.5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
12.133	**Dithiothreitol**							
	$^{\bullet}CH_2OH + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\bullet} + MeOH$	6.5×10^7	7.4			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. dithiothreitol and methanol.	87A250
		6.5×10^7	7.2		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N_2O-satd. soln. contg. DTT and MeOH.	87G007
		8.0×10^7	7.3			p.r.	P.b.k. at 390 nm ($RSSR^-$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and 1 mol L^{-1} MeOH.	85A220
		1.0×10^8	4			p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. MeOH, DTT and $ABTS^{2-}$; the latter reacts with $RS^{\bullet}$ to give $ABTS^{\bullet-}$ which is observed.	82Z335
		6.8×10^7	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	731020
12.134	**Ethylene glycol**							
	$^{\bullet}CH_2OH + HOCH_2CH_2OH \rightarrow MeOH + {}^{\bullet}CHOHCH_2OH$	$\sim 10^3$				γ-r.	Estd. from dose effect on yields in MeOH soln.	710929
12.135	***N*-Ethylmaleimide**							
	$^{\bullet}CH_2OH + NEM \rightarrow$ addn.	2.4×10^9	6-7			p.r.	P.b.k. in N_2O-satd. soln. contg. MeOH; 15% *e*-transfer, 85% addn. based on abs. spectra.	720144
12.136	**Fullerene-C_{60}-γ-cyclodextrin complex**							
	$^{\bullet}CH_2OH + \gamma\text{-CD}/C_{60} \rightarrow HCHO + H^+ + \gamma\text{-CD}/C_{60}^{\bullet-}$	5×10^7				p.r.	D.k. at 331 nm, as well as p.b.k. at 302 nm, in N_2O-satd. soln. contg. 10% MeOH.	93A433
12.137	**Fumarate ion**							
	$^{\bullet}ClI_2OH + trans\text{-}{}^-O_2CCH\text{–}CHCO_2^- \rightarrow {}^-O_2C\dot{C}HCH(CH_2OH)CO_2^-$	$\sim 10^7$				*e*-r.	Esr study of dose rate effect on $^{\bullet}CH_2OH$ and adduct radical (in soln. contg. 1 mol L^{-1} MeOH and 0.01 mol L^{-1} fumarate) assuming $2k(R + R) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	710284
12.138	**Fumaric acid**							
	$^{\bullet}CH_2OH + trans\text{-}HO_2CCH{=}CHCO_2H \rightarrow$	6×10^7	1			Fenton	rel. to $k(^{\bullet}CH_2OH + Fe^{3+}) = 1.0 \times 10^8$ L mol^{-1} s^{-1}.	739341
12.139	**Glutathione**							
	$^{\bullet}CH_2OH + GSH \rightarrow MeOH + GS^{\bullet}$	1.0×10^8	8-10			p.r.	P.b.k. at 420 nm in N_2O-satd. soln. contg. MeOH and glutathione.	88A144

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.139	**Glutathione** — Continued							
		4.0×10^7	8.4			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} MeOH and glutathione.	84A012
		5.9×10^7	4			p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. MeOH, glutathione and $ABTS^{2-}$; the latter reacts with $RS^{\bullet}$ to give $ABTS^{\bullet-}$ which is observed.	82Z335
12.140	**Guanine, conjugate acid**							
	$^{\bullet}CH_2OH + GH^+ \rightarrow$ addn.	$\sim 4 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. MeOH.	94A368
12.141	**Guanosine, conjugate acid**							
	$^{\bullet}CH_2OH + GH+ \rightarrow$ addn.	5.7×10^6	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. MeOH.	94A368
12.142	**Hematoporphyrin IX**							
	$^{\bullet}CH_2O^- + HP \rightarrow HCHO + HP^{\bullet-}$	3.3×10^8	13.0			p.r.	P.b.k. at 600-650 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	741040
	$^{\bullet}CH_2OH + HP \rightarrow HCHO + HP^{\bullet-} + H^+$	$\leq 1 \times 10^7$	7.0			p.r.	P.b.k. at 600-650 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	741040
12.143	**Hexafluorobenzene**							
	$^{\bullet}CH_2O^- + C_6F_6 \rightarrow HCHO + C_6F_6^{\bullet-}$	4.4×10^5	14			p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. 60% MeOH and 1.0 mol L^{-1} KOH.	93A041
12.144	**1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole**							
	$^{\bullet}CH_2OH$ + (ImH)-$NO_2 \rightarrow$	10^8				p.r.	D.k. at 320 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	741135
12.145	**Hypoxanthine, conjugate acid**							
	$^{\bullet}CH_2OH + HxOH_2^+ \rightarrow$ addn.	$\sim 5 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. MeOH.	94A368
12.146	**Indigodisulfonate ion**							
	$^{\bullet}CH_2OH + IDS^{2-} \rightarrow$	2.0×10^9 1.9×10^9	7 9			p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. MeOH; 75% e-transfer at pH 7 and 62% at pH 9.	731078
12.147	**Indigotetrasulfonate ion**							
	$^{\bullet}CH_2OH + ITS^{4-} \rightarrow$	3.0×10^9	7			p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. MeOH; 80% e-transfer.	731078
12.148	**Indophenolate ion**							
	$^{\bullet}CH_2OH + O{=}C_6H_4{=}NC_6H_4O^- \rightarrow$	3.1×10^9	9			p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. MeOH; 92% e-transfer.	731078
12.149	**Inosine, conjugate acid**							
	$^{\bullet}CH_2OH + InoH^+ \rightarrow$ addn.	$\sim 8 \times 10^6$	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. MeOH.	94A368
12.150	**Iodoacetic acid**							
	$^{\bullet}CH_2OH + ICH_2CO_2H \rightarrow {}^{\bullet}CH_2CO_2H +$ other prod.	2.1×10^8	1		293	chem.	Estd. from esr meas. in Ti^{III}-H_2O_2 soln. contg. MeOH; rel. to $2k(^{\bullet}CH_2CO_2H + {}^{\bullet}CH_2CO_2H) = 1.8 \times 10^9\ L\ mol^{-1}\ s^{-1}$.	745286
		$<3.5 \times 10^8$			293	p.r.	P.b.k. at 330 nm.	745286
12.151	**3-Iodopropionic acid**							
	$^{\bullet}CH_2OH + ICH_2CH_2CO_2H \rightarrow {}^{\bullet}CH_2CH_2CO_2H$ + other prod.	1.0×10^5	1		293	chem.	Estd. from esr meas. in Ti^{III}-H_2O_2 soln. contg. MeOH; rel. to $2k(^{\bullet}CH_2CH_2CO_2H + {}^{\bullet}CH_2CH_2CO_2H) = 2.4 \times 10^9\ L\ mol^{-1}\ s^{-1}$.	745286

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.152	**Lipoamide**							
	$^{\bullet}CH_2OH + LS_2 \rightarrow LS_2^{\bullet-} + HCHO + H^+$	3.6×10^8	10.8			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} MeOH.	86A363
12.153	**Maleic acid**							
	$^{\bullet}CH_2OH + cis\text{-}HO_2CCH{=}CHCO_2H \rightarrow$	2.7×10^7	1			Fenton	rel. to $k(^{\bullet}CH_2OH + Fe^{3+}) = 1.0 \times 10^8$ L mol^{-1} s^{-1}.	739341
12.154	**2-Mercaptoethanol**							
	$^{\bullet}CH_2OH + HSCH_2CH_2OH \rightarrow MeOH + {}^{\bullet}SCH_2CH_2OH$	1.3×10^8	10			p.r.	P.b.k. ($RSSR^{\bullet-}$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	690553
12.155	**2-Mercaptopropionylglycine**							
	$^{\bullet}CH_2OH + HSCH(CH_3)CONHCH_2CO_2H \rightarrow MeOH + {}^{\bullet}SCH(CH_3)CONHCH_2CO_2H$	9.6×10^7				p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. MeOH, 2-mercaptopropionylglycine and $ABTS^{2-}$; the latter reacts with $RS^{\bullet}$ to give $ABTS^{\bullet-}$ which is observed.	82Z335
12.156	**Methacrylic acid**							
	$^{\bullet}CH_2OH + H_2C{=}C(CH_3)CO_2H \rightarrow$ addn.	6.0×10^6	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and MeOH; calcd. using $2k(R + R) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	93D265
12.157	**4-Methoxybenzenediazonium cation**							
	$^{\bullet}CH_2OH + 4\text{-}CH_3OC_6H_4N_2^+ \rightarrow HCHO + 4\text{-}CH_3OC_6H_4 + N_2 + H^+$	1.9×10^9	4			p.r.	D.k. at 330 nm in N_2O-satd. soln. contg. 2×10^{-3} mol L^{-1} MeOH.	81A297
12.158	**4-Methoxyphenyl-*N*-*tert*-butylnitrone**							
	$^{\bullet}CH_2OH + 4\text{-}CH_3O\text{-}PBN \rightarrow$	2.9×10^7				p.r.	C.k. in N_2O-satd. soln. contg. *p*-nitroacetophenone and MeOH; rel. to $k(^{\bullet}CH_2OH + PNAP) = 1 \times 10^8$ L mol^{-1} s^{-1}.	82A184
12.159	**4-Methylbenzenediazonium cation**							
	$^{\bullet}CH_2OH + 4\text{-}CH_3C_6H_4N_2^+ \rightarrow 4\text{-}CH_3C_6H_4 + HCHO + N_2 + H^+$	1.8×10^9	4			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH and $HClO_4$; also bleaching at 285 nm.	81A297
12.160	**Methylene Blue cation**							
	$^{\bullet}CH_2OH + MB^+ \rightarrow HCHO + H^+ + {}^{\bullet}MB$	3.4×10^9	7			p.r.	D.k. at 580 nm in N_2O-satd. soln. contg. MeOH; 91% *e*-transfer.	731078
12.161	**2-Methyl-1,4-naphthoquinone**							
	$^{\bullet}CH_2O^- + 2\text{-}CH_3NQ \rightarrow HCHO + [2\text{-}CH_3NQ]^{\bullet-}$	4.4×10^9	12.4			p.r.	P.b.k. at 395 nm in soln. contg. 0.05 mol L^{-1} MeOH; 92% *e*-transfer.	731047
	$^{\bullet}CH_2OH + 2\text{-}CH_3NQ \rightarrow HCHO + [2\text{-}CH_3NQ]^{\bullet-} + H^+$	3.7×10^9	7.0			p.r.	P.b.k. at 395 nm in 0.05 mol L^{-1} MeOH; 88% *e*-transfer.	731047
12.162	**Methyl 4-nitrobenzenesulfonate**							
	$^{\bullet}CH_2OH + 4\text{-}O_2NC_6H_4SO_3CH_3 \rightarrow HOCH_2ON(\dot{O})C_6H_4\text{-}4\text{-}SO_3CH_3$	1.2×10^8	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
	$^{\bullet}CH_2O^- + 4\text{-}O_2NC_6H_4SO_3CH_3 \rightarrow HCHO + [4\text{-}O_2NC_6H_4SO_3CH_3]^{\bullet-}$	~3×10^9	~11.5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
12.163	**Methyl 4-nitrobenzoate**							
	$^{\bullet}CH_2OH + 4\text{-}O_2NC_6H_4CO_2CH_3 \rightarrow HOCH_2ON(\dot{O})C_6H_4\text{-}4\text{-}CO_2CH_3$	6.6×10^7	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
	$^{\bullet}CH_2O^- + 4\text{-}O_2NC_6H_4CO_2CH_3 \rightarrow HCHO + [4\text{-}O_2NC_6H_4CO_2CH_3]^{\bullet-}$	~3×10^9	~11.5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
12.164	**2-Methyl-2-nitrosopropane**							
	$^{\bullet}CH_2OH + (CH_3)_3CNO \rightarrow$ addn.	1.4×10^8	~7		~291	p.r.	P.b.k. (esr) in unbuffered N_2O-satd. soln. contg. 0.25 mol L^{-1} methanol and (0.25-15) $\times 10^{-3}$ mol L^{-1} MNP (assuming complete dimer dissociation).	91D097
12.165	**1-Methyl-1'-octadecyl-4,4'-bipyridinium**							
	$^{\bullet}CH_2OH + MSV^{2+} \rightarrow MSV^{\bullet+} + HCHO + H^+$	2×10^8	3			p.r.	Abs. changes in Ar-satd. soln. contg. 1 mol L^{-1} MeOH.	82N168
12.166	**4-Methylphenyl-*N*-*tert*-butylnitrone**							
	$^{\bullet}CH_2OH$ + 4-CH_3-PBN $\rightarrow$	2.5×10^7				p.r.	C.k. in N_2O-satd. soln. contg. *p*-nitroacetophenone and MeOH; rel. to $k(^{\bullet}CH_2OH + PNAP) = 1 \times 10^8$ L $mol^{-1}\ s^{-1}$.	82A184
12.167	**3-Methylpterin, conjugate acid**							
	$^{\bullet}CH_2OH$ + 3-MPTH$^+ \rightarrow$	6×10^7	0.8			p.r.	P.b.k. in N_2O-satd. soln. contg. MeOH; ~45% *e*-transfer.	761060
12.168	**Nicotinamide adenine dinucleotide**							
	$^{\bullet}CH_2OH + NAD^+ \rightarrow HCHO + H^+ +$ NAD$^{\bullet}$	1.0×10^9	6.0			p.r.	P.b.k.	731104
12.169	**Nifuroxime**							
	$^{\bullet}CH_2OH + NF \rightarrow NF^{\bullet-} + HCHO + H^+$	8×10^8	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} MeOH; 90% *e*- transfer.	731099
12.170	**4-Nitroacetophenone**							
	$^{\bullet}CH_2OH + PNAP \rightarrow HOCH_2ON(\dot{O})C_6H_4$-4-$COCH_3$	8.6×10^7	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH; $\Delta H‡ = 6.9$ kJ mol^{-1}, $\Delta S‡ = -69.5$ J K^{-1} mol^{-1}, studied at 273-333 K; adduct decomposes to radical anion; see also [730122].	88A099 84A305
	$^{\bullet}CH_2O^- + PNAP \rightarrow HCHO + [PNAP]^{\bullet-}$	4.7×10^9	13			p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. MeOH.	730122
12.171	**4-Nitrobenzaldehyde**							
	$^{\bullet}CH_2OH$ + 4-$O_2NC_6H_4CHO \rightarrow HOCH_2ON(\dot{O})C_6H_4$-4-CHO	9.1×10^7	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
	$^{\bullet}CH_2O^-$ + 4-$O_2NC_6H_4CHO \rightarrow HCHO + [4\text{-}O_2NC_6H_4CHO]^{\bullet-}$	$\sim 3 \times 10^9$	~11.5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
12.172	**4-Nitrobenzamide**							
	$^{\bullet}CH_2OH$ + 4-$O_2NC_6H_4CONH_2 \rightarrow HOCH_2ON(\dot{O})C_6H_4$-4-$CONH_2$	7.3×10^7	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH; $\Delta H‡ = 7.6$ kJ mol^{-1}, $\Delta S‡ = -67$ J K^{-1} mol^{-1}, studied at 273-333 K.	88A099 84A305
	$^{\bullet}CH_2O^-$ + 4-$O_2NC_6H_4CONH_2 \rightarrow HCHO + [4\text{-}O_2NC_6H_4CONH_2]^{\bullet-}$	$\sim 3 \times 10^9$	~11.5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
12.173	**Nitrobenzene**							
	$^{\bullet}CH_2OH + C_6H_5NO_2 \rightarrow$	6.0×10^7	5-6			p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	72A018
		$<10^7$	7			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	660432
	$^{\bullet}CH_2O^- + C_6H_5NO_2 \rightarrow HCHO + [C_6H_5NO_2]^{\bullet-}$	2.7×10^9	13			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	660432
12.174	**4-Nitrobenzenediazonium ion**							
	$^{\bullet}CH_2OH + 4\text{-}NO_2C_6H_4N_2^+ \rightarrow 4\text{-}NO_2C_6H_4 + N_2 + HCHO + H^+$	5.2×10^9	4			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01 mol L^{-1} MeOH and $HClO_4$.	81A297

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
12.175	**4-Nitrobenzenesulfonamide**							
	$^{\bullet}CH_2OH + 4\text{-}O_2NC_6H_4SO_2NH_2 \rightarrow HOCH_2ON(\dot{O})C_6H_4\text{-}4\text{-}SO_2NH_2$	8.6×10^7	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH; $\Delta H^{\ddagger} = 4.4$ kJ mol^{-1}, $\Delta S^{\ddagger} = -81$ J K^{-1} mol^{-1}, studied at 273-333 K.	88A099 84A305
	$^{\bullet}CH_2O^- + 4\text{-}O_2NC_6H_4SO_2NH_2 \rightarrow HCHO + [4\text{-}O_2NC_6H_4SO_2NH_2]^{\bullet -}$	$\sim 3 \times 10^9$	~11.5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
12.176	**4-Nitrobenzonitrile**							
	$^{\bullet}CH_2OH + 4\text{-}O_2NC_6H_4CN \rightarrow HOCH_2ON(\dot{O})C_6H_4\text{-}4\text{-}CN$	1.0×10^8	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH; $\Delta H^{\ddagger} = 7.1$ kJ mol^{-1}, $\Delta S^{\ddagger} = -67$ J K^{-1} mol^{-1} in D_2O.	88A099 84A305
	$^{\bullet}CH_2O^- + 4\text{-}O_2NC_6H_4CN \rightarrow HCHO + [4\text{-}O_2NC_6H_4CN]^{\bullet -}$	$\sim 3 \times 10^9$	~11.5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	84A305
12.177	***aci*-Nitromethane anion**							
	$^{\bullet}CH_2O^- + CH_2NO_2^- \rightarrow$ adduct formation	2.1×10^7	11.3		~285	p.r.	P.b.k. (esr) in N_2O-satd. soln. contg. (0.5-5) $\times$ 10^{-3} mol L^{-1} nitromethane and 0.5 mol L^{-1} MeOH; d.k. gave $k = 2.6 \times 10^7$ L mol^{-1} s^{-1}; $k = 2.1 \times 10^7$ L mol^{-1} s^{-1} for electron transfer.	88D069
12.178	**4-Nitroperoxybenzoic acid**							
	$^{\bullet}CH_2OH + 4\text{-}O_2NC_6H_4CO_3H \rightarrow HCHO + H^+ + [4\text{-}O_2NC_6H_4CO_3H]^{\bullet -}$	2×10^8				p.r.	P.b.k. at 330 nm in N_2O-satd. soln. contg. MeOH; 20% e-transfer based on condy. changes, also adduct formn.	741078
12.179	***4-Nitrophenyl-N-tert*-butylnitrone**							
	$^{\bullet}CH_2OH + 4\text{-}NO_2\text{-PBN} \rightarrow$	1.2×10^9				p.r.	C.k. in N_2O-satd. soln. contg. *p*-nitroacetophenone and MeOH; rel. to $k(^{\bullet}CH_2OH + PNAP) = 1 \times 10^8$ L mol^{-1} s^{-1}.	82A184
12.180	**Nitrosobenzene**							
	$^{\bullet}CH_2O^- + C_6H_5NO \rightarrow HCHO + C_6H_5\dot{N}O^-$	6.8×10^9	13.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} MeOH.	660433
	$^{\bullet}CH_2OH + C_6H_5NO \rightarrow HCHO + C_6H_5\dot{N}OH$	3.2×10^9	7.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} MeOH.	660433
12.181	***p*-Nitro-α,α,α-trifluorotoluene**							
	$^{\bullet}CH_2OH + 4\text{-}CF_3C_6H_4NO_2 \rightarrow HOCH_2ON(\dot{O})C_6H_4\text{-}4\text{-}CF_3$	1.2×10^8	4.5-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH; $\Delta H^{\ddagger} = 9.2$ kJ mol^{-1}, $\Delta S^{\ddagger} = -60$ J K^{-1} mol^{-1}, studied at 273-333 K.	88A099
12.182	**Penicillamine**							
	$^{\bullet}CH_2OH + PenSH \rightarrow MeOH + PenS^{\bullet}$	3.4×10^7				p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. MeOH, penicillamine and $ABTS^{2-}$; the latter reacts with $RS^{\bullet}$ to give $ABTS^{\bullet -}$ which is observed.	82Z335
		1.1×10^8				p.r.	P.b.k. at 450 nm in soln. contg. 0.5 or 1 mol L^{-1} MeOH.	731073
12.183	**1,10-Phenanthroline**							
	$^{\bullet}CH_2O^- + phen \rightarrow$	$<1 \times 10^7$	~13			p.r.	P.b.k. at 490 nm in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	80A115
		$<10^6$	13			p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} MeOH; no reaction.	79A148
	$^{\bullet}CH_2OH + phen \rightarrow$	$<10^6$	7			p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} MeOH.; no reaction.	79A148
12.184	**Phenosafranine cation**							
	$^{\bullet}CH_2OH + PSF^+ \rightarrow$	1.2×10^9	7			p.r.	D.k at 520 nm in N_2O-satd. soln. contg. MeOH; 22% e-transfer.	731078

TABLE 12. Hydroxymethyl — Continued

Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.185 Phenyl-*N*-*tert*-butylnitrone							
$^{\bullet}CH_2O^- + PBN \rightarrow$	1.2×10^7	alk.			p.r.	C.k.; rel. to $k(^{\bullet}CH_2O^- + PNAP) = 4.7 \times 10^9$ L $mol^{-1}\ s^{-1}$.	82A184
$^{\bullet}CH_2OH + PBN \rightarrow$	4.3×10^7				p.r.	C.k. in N_2O-satd. soln. contg. *p*-nitroacetophenone and MeOH; rel. to $k(^{\bullet}CH_2OH + PNAP) = 1 \times 10^8$ L $mol^{-1}\ s^{-1}$.	82A184
12.186 1-Propylimidazole							
$^{\bullet}CH_2OH + PIA \rightarrow$	1.1×10^7				γ-r.	C.k. in N_2O-satd. soln. contg. 4.9 mol L^{-1} MeOH. rel. to $k(^{\bullet}CH_2OH + 4\text{-}Me_2NC_6H_4NO) = 2.7 \times 10^8$ L $mol^{-1}\ s^{-1}$.	94A511
12.187 Pteridine							
$^{\bullet}CH_2OH + C_6H_4N_4 \rightarrow$	3.6×10^8	6.0			p.r.	P.b.k. in N_2O-satd. soln. contg. MeOH.	761060
12.188 Pterin							
$^{\bullet}CH_2OH + PnH \rightarrow$	$\ll 10^7$	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. MeOH.	761060
12.189 Pterin, conjugate acid							
$^{\bullet}CH_2OH + PnH_2^+ \rightarrow$	9.0×10^7	0.8			p.r.	P.b.k. in N_2O-satd. soln. contg. MeOH; ~40% *e*-transfer.	761060
12.190 Pterin, conjugate base							
$^{\bullet}CH_2O^- + Pn^- \rightarrow$	6.0×10^8	13.0			p.r.	P.b.k. in N_2O-satd. soln. contg. MeOH; 100% *e*-transfer.	761060
12.191 Pyrene							
$^{\bullet}CH_2O^- + Py \rightarrow$		13			p.r.	No reaction obs.; buildup of Py^- in micellar soln. contg. 0.2 mol L^{-1} MeOH after photolysis attributed to triplet pyrene, $k(^{\bullet}CH_2O^- + {}^3Py) = 1.8 \times 10^{10}$ L $mol^{-1}\ s^{-1}$.	761062
12.192 Tetrafluoro-1,4-benzoquinone							
$^{\bullet}CH_2OH + F_4Q \rightarrow HCHO + H^+ + F_4Q^{\bullet -}$	3.1×10^9	5.8			p.r.	P.b.k. at 435 nm in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH.	94A417
12.193 5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine							
$^{\bullet}CH_2OH + H_2TPPS^{4-} \rightarrow H_2TPPS(H)^{\bullet 4-} + HCHO$	1.1×10^8	8.0-8.5			p.r.	Abs. changes in soln. contg. MeOH.	92A304
	1.9×10^8	10.4			p.r.	P.b.k. at 700 nm in Ar-satd. soln. contg. 0.1 mol L^{-1} MeOH.	92A009
$^{\bullet}CH_2OH + H_4TPPS^{2-} \rightarrow H_4TPPS^{\bullet 3-} + H^+ + HCHO$	1.0×10^9	3.5			p.r.	D.k. at 650 nm, as well as p.b.k. above 700 nm and below 550 nm, and condy. changes in Ar-satd. soln. contg. 0.1 mol L^{-1} MeOH.	92A009
$^{\bullet}CH_2O^- + (H_2TPPS^{4-})_2 \rightarrow (H_2TPPS)_2^{\bullet 9-} + HCHO$	1.5×10^9	13			p.r.	P.b.k. at 700 nm in Ar-satd. soln. contg. 0.1 mol L^{-1} MeOH.	92A009
12.194 2,2,6,6-Tetramethylpiperidine-*N*-oxyl							
$^{\bullet}CH_2OH + TMPN \rightarrow$ addn.	4.4×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	761067
12.195 2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl							
$^{\bullet}CH_2OH + TAN \rightarrow$ addn.	7.2×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	761067
	7.2×10^8	5-6			p.r.	C.k. in N_2O-satd. soln. contg. 1 mol L^{-1} MeOH; rel. to $k(^{\bullet}CH_2OH$ + ferricyanide) = 4.0×10^9 L $mol^{-1}\ s^{-1}$.	710618

TABLE 12. Hydroxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
12.196	**Tetranitromethane**							
	$^{\bullet}CH_2OH + C(NO_2)_4 \rightarrow HCHO + {}^{\bullet}NO_2 + H^+ + C(NO_2)_3^-$	5.0×10^9				p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	640133
12.197	**Thionine cation**							
	$^{\bullet}CH_2OH + Th^+ \rightarrow HCHO + H^+ + {}^{\bullet}Th$	4.6×10^9	6.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH and 10^{-4} mol L^{-1} thionine.	87A451
		2.6×10^9	8			p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. MeOH; 86% e-transfer.	731078
12.198	**Thymine**							
	$^{\bullet}CH_2OH$ + 5-MeU $\rightarrow$	2.6×10^8	7			X-r.	Effect of [MeOH] on $G(-T)$ in aerated soln.; rel. to $k(^{\bullet}CH_2OH + O_2) = 4.2 \times 10^9$ L mol^{-1} s^{-1}.	680359
12.199	**Toluidine Blue cation**							
	$^{\bullet}CH_2OH + TB^+ \rightarrow HCHO + [TBH]^{\bullet+}$	3.7×10^9	6.8			p.r.	P.b.k. at 830 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH.	89A262
12.200	**Cytochrome C**							
	$^{\bullet}CH_2OH$ + Cyt C (Fe^{3+}) $\rightarrow HCHO + H^+$ + Cyt C (Fe^{2+})	4.6×10^8	8.0-8.5			p.r.	Abs. changes at 550 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} MeOH; 40% Fe(III) redn.	89R257
		3.0×10^7	7			p.r.	Abs. changes at 550 and 435 nm in N_2O-satd. soln. contg. MeOH; 100% redn.	79A153
12.201	**Methemoglobin**							
	$^{\bullet}CH_2OH + Fe^{3+}$ Hb $\rightarrow HCHO + H^+ +$ Fe^{2+} Hb	9.5×10^6	7			p.r.	Abs. changes at 550 and 435 nm in N_2O-satd. soln. contg. MeOH; 100% redn.	79A153
12.202	**Metmyoglobin**							
	$^{\bullet}CH_2OH + Fe^{3+}$Mb $\rightarrow HCHO + H^+ +$ Fe^{2+}Mb	2.4×10^7	7			p.r.	Abs. changes at 550 and 435 nm in N_2O-satd. soln. contg. MeOH; 95% redn. of hemoprotein.	79A153

TABLE 13. 1-Hydroxyethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.1	**1-Hydroxyethyl**							
	$CH_3\dot{C}HOH + CH_3\dot{C}HOH \rightarrow$	1.2×10^9	6			p.r.	D.k. at 280 nm, in N_2O-satd. soln. contg. EtOH; $pK_a = 11.6$ [660074]; $2k/\varepsilon = 4.7 \times 10^6$ cm s^{-1}.	690419
		7×10^8	~1			p.r.	D.k. at 296.7 nm in deaerated soln. contg. EtOH and 0.8 N H_2SO_4; $\varepsilon = 240$ L mol^{-1} cm^{-1}.	630045
		5.5×10^8	~7			p.r.	D.k. at 289.4 nm in deaerated soln. contg. EtOH; $\varepsilon = 260$ L mol^{-1} cm^{-1}; 80% combination and 20% disproportionation from product yields.	620140
13.2	**1-Hydroxyethyl(1-) ion**							
	$CH_3\dot{C}HO^- + CH_3\dot{C}HO^- \rightarrow$	2.5×10^8	13			p.r.	D.k. at 300 nm, in N_2O-satd. soln. contg. EtOH; $2k/\varepsilon = 5.7 \times 10^6$ cm s^{-1}.	690419
13.3	**Silver(I) ion, complex with Ag(0)**							
	$CH_3\dot{C}HOH + Ag_2^+ \rightarrow CH_3CHO + H^+ + Ag_2$	1.0×10^9				p.r.	Calcd. from increase in condy. as function of time in soln. contg. EtOH and $AgClO_4$.	78A410
13.4	**Bismuth(III) ion**							
	$CH_3\dot{C}HOH + Bi^{3+} \rightarrow BiCH(CH_3)OH^{3+}$	4×10^6	<0			p.r.	P.b.k. at ~400 nm in Ar-satd. soln. contg. 5 mol L^{-1} $HClO_4$ and EtOH.	88A493
13.5	**Bromate ion**							
	$CH_3\dot{C}HO^- + BrO_3^- \rightarrow$	3.0×10^7	11.8			p.r.	D.k. in soln. contg. EtOH.	72A018
	$CH_3\dot{C}HOH + BrO_3^- \rightarrow$	$<5 \times 10^6$	6			p.r.	D.k. in soln. contg. EtOH.	72A018
13.6	**Cadmium(I) ions**							
	$CH_3\dot{C}HOH + Cd^+ \rightarrow CdCHOHCH_3^+$	1.3×10^9				p.r.	D.k. at 300 nm (Cd^+) in soln. contg. EtOH and Cd^{2+}, as well as condy. and p.b.k. at 240 nm (Cd_2^{2+}); assumed $k(Cd^+ + H_2O_2) = 1.5 \times 10^9$, $k(R + R) = 1.15 \times 10^9$ and $2k(Cd^+ + Cd^+) = 3.0 \times 10^9$ L mol^{-1} s^{-1}.	751064
13.7	**Cadmium(II) ion**							
	$CH_3\dot{C}HOH + Cd^{2+} \rightarrow$	$<2.5 \times 10^5$				p.r.	No reaction obs.	751153
13.8	***N-rac*-5,7,7,12,14,14-H amethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$CH_3\dot{C}HOH$ + *N-rac*-Co(4,11-dieneN$_4$)$^{2+}$ → HOCH(CH$_3$)Co(4,11-dieneN$_4$)$^{2+}$	3.0×10^7	1-6			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH.	78A200
13.9	**Diaqua(nitrilotriacetato)cobaltate(II) ion**							
	$CH_3\dot{C}HOH + CoNTA^- \rightarrow HOCH(CH_3)CoNTA^-$	9.7×10^7	4-7		298	p.r.	P.b.k. at 260 nm in N_2O-satd. soln. contg. $1\text{-}50 \times 10^{-4}$ mol L^{-1} CoNTA and 0.2-1 mol L^{-1} EtOH.	88A343
13.10	**Hexaamminecobalt(III) ion**							
	$CH_3\dot{C}HO^- + Co(NH_3)_6^{3+} \rightarrow$	8.5×10^9	12			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} EtOH; *e*-transfer.	72A018
	$CH_3\dot{C}HOH + Co(NH_3)_6^{3+} \rightarrow$	5.2×10^7	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} EtOH; *e*-transfer.	72A018
13.11	**Pentaammine(bromo)cobalt(III) ion**							
	$CH_3\dot{C}HOH + Co(NH_3)_5Br^{2+} \rightarrow$	1.5×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	771100
13.12	**Pentaammine(chloro)cobalt(III) ion**							
	$CH_3\dot{C}HOH + Co(NH_3)_5Cl^{2+} \rightarrow$	3.0×10^6	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	771100

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.13	**Tris(ethylenediamine)cobalt(III) ion**							
	$CH_3\dot{C}HOH + Co(en)_3^{3+} \rightarrow$		3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH; no reaction.	771100
13.14	***trans*-Dibromobis(ethylenediamine)cobalt(III) ion**							
	$CH_3\dot{C}HOH + Co(en)_2Br_2^{+} \rightarrow$	5.7×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	771100
13.15	***cis*-Bromobis(ethylenediamine)fluorocobalt(III) ion**							
	$CH_3\dot{C}HOH + Co(en)_2BrF^{+} \rightarrow$	2.8×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	771100
13.16	***cis*-Aquachlorobis(ethylenediamine)cobalt(III) ion**							
	$CH_3\dot{C}HOH + cis\text{-}Co(en)_2(H_2O)Cl^{2+} \rightarrow$	2.0×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	771100
13.17	***trans*-Dichlorobis(ethylenediamine)cobalt(III) ion**							
	$CH_3\dot{C}HOH + trans\text{-}Co(en)_2Cl_2^{+} \rightarrow$	1.5×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	771100
13.18	***cis*-Dichlorobis(ethylenediamine)cobalt(III) ion**							
	$CH_3\dot{C}HOH + cis\text{-}Co(en)_2Cl_2^{+} \rightarrow$	3.8×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	771100
13.19	***cis*-Amminechlorobis(ethylenediamine)cobalt(III) ion**							
	$CH_3\dot{C}HOH + cis\text{-}Co(en)_2(NH_3)Cl^{2+} \rightarrow$	4.2×10^6	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	771100
13.20	**Bis(ethylenediamine)difluorocobalt(III) ion**							
	$CH_3\dot{C}HOH + Co(en)_2F_2^{+} \rightarrow$		3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. EtOH; no reaction.	771100
13.21	**Tris(1,10-phenanthroline)cobalt(III) ion**							
	$CH_3\dot{C}HOH + Co(phen)_3^{3+} \rightarrow$ addn. to ligand	3.8×10^9	1-7			p.r.	P.b.k. at 475 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} EtOH.	80A227
13.22	**Tris(5,6-dimethyl-1,10-phenanthroline)cobalt(III) ion**							
	$CH_3\dot{C}HOH + Co(5,6\text{-}Me_2phen)_3^{3+} \rightarrow CH_3CHO + H^+ + Co(5,6\text{-}Me_2phen)_3^{2+}$	3.1×10^9	~7			p.r.	P.b.k., as well as d.k. at 380 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} EtOH.	80A227
13.23	**μ-Amido-μ-superoxidooctakisamminedicobalt(III) ion**							
	$CH_3\dot{C}HOH + NH_2[Co(NH_3)_4]_2(O_2)^{4+} \rightarrow CH_3CHO + H^+ + NH_2[Co(NH_3)_4]_2(O_2)^{3+}$	1.0×10^8	~5.0			p.r.	P.b.k. as well as d.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	81A009
13.24	**μ-Amido-μ-superoxidotetrakis(ethylenediamine)dicobalt(III) ion**							
	$CH_3\dot{C}HOH + NH_2[Co(en)_2]_2(O_2)^{4+} \rightarrow CH_3CHO + H^+ + NH_2[Co(en)_2]_2(O_2)^{3+}$	2×10^7	~5.0			p.r.	P.b.k. as well as d.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	81A009
13.25	**Decakis(cyano)-μ-superoxidodicobaltate(III) ion**							
	$CH_3\dot{C}HOH + O_2[Co(CN)_5]_2^{5-} \rightarrow CH_3CHO + H^+ + O_2[Co(CN)_5]_2^{6-}$	1.2×10^8	~5.0			p.r.	P.b.k. as well as d.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	81A009
13.26	**Chromium(II) ion**							
	$CH_3\dot{C}HOH + Cr^{2+} \rightarrow CrCHOHCH_3^{2+}$	1.1×10^8	~3		293	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and ethanol.	92A361
		1.0×10^8	0-6.2			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.01-2 mol L^{-1} EtOH, $(1\text{-}20) \times 10^{-4}$ mol L^{-1} Cr^{2+} and $(9\text{-}100) \times 10^{-4}$ AcO^-/AcOH.	84A036
		7.9×10^7	~1			p.r.	P.b.k. in Ar-satd. soln. contg. EtOH and $HClO_4$.	741146
13.27	***cis*-Diaqua(nitrilotriacetato)chromate(II) ion**							
	$CH_3\dot{C}HOH + cis\text{-}[CrNTA(H_2O)_2]^- \rightarrow cis\text{-}[CH_3CH(OH)CrNTA(H_2O)]^- + H_2O$	1.0×10^8	5.0-6.4			p.r.	P.b.k. at 325 nm in He-satd. soln. contg. 0.055 mol L^{-1} NTA, $(0.42\text{-}1.0) \times 10^{-3}$ mol L^{-1} Cr^{2+}, 0.009 mol L^{-1} acetate, 1.8 mol L^{-1} EtOH and 0.16 mol L^{-1} acetaldehyde.	85A499

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.28	**Ethylenediaminetetraacetatochromium(II) ion**							
	$CH_3\dot{C}HOH + CrEDTA^{2-} \rightarrow [CH_3CH(OH)CrEDTA]^{2-} + H_2O$	3.9×10^7	5			p.r.	P.b.k. in He-satd. soln. contg. EDTA, Cr^{2+}, 0.009 mol L^{-1} acetate, 1.8 mol L^{-1} EtOH and 0.16 mol L^{-1} acetaldehyde.	85A499
13.29	**Copper(II) ion**							
	$CH_3\dot{C}HOH + Cu^{2+} \rightarrow Cu^+ + CH_3CHO + H^+$	9×10^7	6			p.r.	D.k. at ~300 nm (radical) in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	80A277
		9.4×10^7	2-5		298	p.r.	P.b.k. at 320 nm ($Cu^I CH_2CHCONH_2$) in soln. contg. EtOH and 0.01 mol L^{-1} acrylamide.	78A322
		7.4×10^7	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} EtOH.	72A018
13.30	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecopper(II) ion**							
	$CH_3\dot{C}HOH + Cu(4,11\text{-dieneN}_4)^{2+} \rightarrow Cu(4,11\text{-dieneN}_4)^+ + CH_3CHO + H^+$	$\leq 2 \times 10^6$	3.5-10			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	80A189
13.31	***cis*-Diaqua(nitrilotriacetato)copper(II) ion**							
	$CH_3\dot{C}HOH + cis\text{-}[Cu(NTA)(H_2O)_2]^- \rightarrow cis\text{-}[HOCH(CH_3)Cu(NTA)(H_2O)]^-$	6.0×10^7	5-8			p.r.	P.b.k. in N_2O-satd. soln. contg. $CuSO_4$, nitrilotriacetate ion and EtOH.	86B151
13.32	**Iron(II) protoporphyrin**							
	$CH_3\dot{C}HOH + Fe(II)PP \rightarrow$ addn.	4×10^8	10.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2×10^{-5} mol L^{-1} Fe(II)PP and 0.1 mol L^{-1} ethanol.	85A006
13.33	**Iron(III) ion**							
	$CH_3\dot{C}HOH + Fe^{3+} \rightarrow Fe^{2+} + H^+ + CH_3CHO$	3.8×10^8					Unpubl. data, C.N.Barnes and G.V.Buxton.	78A322
		2.7×10^8	~1			γ-r.	C.k.; obs. $C(NO_2)_3^-$ and Fe^{2+} yields; rel. to $k(CH_3\dot{C}HOH + C(NO_2)_4) = 5.6 \times 10^9$ L $mol^{-1}\ s^{-1}$.	77G411
13.34	**Hemin**							
	$CH_3\dot{C}HOH + Fe(III)PP(Cl) \rightarrow Fe(II)PP + H^+ + CH_3CHO$	5.6×10^8 1.6×10^9	9.2 4.0			p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH and 0.2 mol L^{-1} Na dodecylsulfate (micelles).	78A033
		7.7×10^8	7			p.r.	Redn. obs. at 560 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	771128
	$CH_3\dot{C}HO^- + Fe(III)PP(Cl) \rightarrow Fe(II)PP + CH_3CHO$	9.0×10^8	13			p.r.	P.b.k. as well as d.k. in N_2O-satd. soln. contg. 30% EtOH.	741040
13.35	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatoiron(III) ion**							
	$CH_3\dot{C}HOH + FeTMpyP^{5+} \rightarrow CH_3CHO + H^+ + FeTMpyP^{4+}$	2.7×10^8	8.5-9.5			p.r.	P.b.k. at 562 nm as well as d.k. at 497 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} EtOH.	91A380
13.36	**Pentacyano(nitrosyl)ferrate(III) ion**							
	$CH_3\dot{C}HOH + Fe(CN)_5(NO)^{2-} \rightarrow Fe(CN)_5NO^{3-} + H^+ + CH_3CHO$	1.9×10^9	7			p.r.	P.b.k. at 435 nm in Ar-satd. soln. contg. 0.5 mol L^{-1} ethanol and 5×10^{-4} mol L^{-1} substrate; follows hydrated electron reaction; also in N_2O-satd. soln.	86A306
13.37	**Ferricyanide ion**							
	$CH_3\dot{C}HOH + Fe(CN)_6^{3-} \rightarrow$	4×10^9				p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. EtOH.	79N061
		5.3×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.1 mol L^{-1} EtOH.	690522

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.38	**Tris(1,10-phenanthroline)iron(III) ion**							
	$CH_3\dot{C}HOH + Fe(phen)_3^{3+} \rightarrow CH_3CHO + Fe(phen)_3^{2+} + H^+$	5×10^9	~1			p.r.	P.b.k. at 490 nm in soln. contg. 0.1-1 mol L^{-1} EtOH and $(0.4\text{-}1.0) \times 10^{-4}$ mol L^{-1} complex; outer-sphere electron transfer.	85A284
13.39	**Ferrate(VI) ion**							
	$CH_3\dot{C}HOH + FeO_4^{2-} \rightarrow CH_3CHO + H^+ + FeO_4^{3-}$	8×10^9	12.4		~296	p.r.	P.b.k. at 380 nm in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH.	91A475
		8.0×10^9	10.4		298	p.r.	P.b.k. in N_2O-satd. soln. contg. EtOH.	89A354
13.40	**Hexahydroxygallate(II) ion**							
	$CH_3\dot{C}HO^- + Ga(OH)_6^{4-} \rightarrow$	1.2×10^9	12.0	→0		p.r.	D.k. in soln. contg. EtOH; Ga(II) from e_{aq}^- + Ga(III).	79A190
13.41	**Mercury(I) cyanide**							
	$CH_3\dot{C}HOH + HgCN \rightarrow$	3.9×10^9				p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. EtOH and $Hg(CN)_2$; used $2k(HgCN + HgCN) = 3.4 \times 10^9$.	751203
13.42	**Mercury(II) iodide**							
	$CH_3\dot{C}HOH + HgI_2 \rightarrow$	7×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. EtOH.	78A165
13.43	**Iodate ion**							
	$CH_3\dot{C}HOH + IO_3^- \rightarrow$	$<5 \times 10^6$	6			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	72A018
	$CH_3\dot{C}HO^- + IO_3^- \rightarrow$	7.5×10^8	11.8			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	72A018
13.44	**Hexachloroiridate(IV) ion**							
	$CH_3\dot{C}HOH + IrCl_6^{2-} \rightarrow CH_3CHO + H^+ + IrCl_6^{3-}$	4.5×10^9	4-6		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. EtOH.	82A041
13.45	**Permanganate ion**							
	$CH_3\dot{C}HOH + MnO_4^- \rightarrow CH_3CHO + H^+ + MnO_4^{2-}$	3.3×10^9	10.4		298	p.r.	P.b.k. in N_2O-satd. soln. contg. EtOH.	89A354
13.46	**18-Molybdodiphosphate ion(6-)**							
	$CH_3\dot{C}HOH + P_2Mo_{18}O_{62}^{6-} \rightarrow CH_3CHO + HP_2Mo_{18}O_{62}^{6-}$	4.4×10^9	2		295	p.r.	P.b.k. in N_2O-satd. (2.5×10^{-2} mol L^{-1}) soln. contg. 0.5 mol L^{-1} EtOH and ~10^{-4} mol L^{-1} heteropolymolybdophosphate.	82A107
13.47	**Nitric oxide**							
	$CH_3\dot{C}HOH + {}^{\bullet}NO \rightarrow$ addn.	3.0×10^9	6.8		296	p.r.	P.b.k. at 270 nm in N_2O-satd. soln. contg. NO and 1 mol L^{-1} EtOH; includes contribution from β-radical.	94A457
13.48	**Nitrite ion**							
	$CH_3\dot{C}HOH + NO_2^- \rightarrow$	$<5 \times 10^6$	6			p.r.	D.k. in N_2O-satd. soln. contg. EtOH	72A018
13.49	**Nitrate ion**							
	$CH_3\dot{C}HOH + NO_3^- \rightarrow$	$<5 \times 10^6$	6			p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	72A018
13.50	**Nickel(I) ion**							
	$CH_3\dot{C}HOH + Ni^+ \rightarrow NiCHOHCH_3^+$	2.3×10^9				p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. cont. $NiSO_4$ and EtOH.	741037
13.51	**3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonickel(IV) ion**							
	$CH_3\dot{C}HOH + Ni^{IV}L^{2+} \rightarrow CH_3CHO + H^+ + [Ni^{III}L]^+$	3.5×10^9	2.3-2.5		294	p.r.	P.b.k. at 500 or 430 nm in N_2O-satd. soln. contg. EtOH.	85A354

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.52	**Hydroxide ion**							
	$CH_3\dot{C}HOH + OH^- \rightarrow CH_3\dot{C}HO^- + H_2O$	7×10^9	11-12			*e*-r.	Esr line broadening in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH; $k_r = 4.1 \times 10^5$ L $mol^{-1}\ s^{-1}$ ($pK_a = 11.51$).	735065
13.53	**Hydrogen peroxide**							
	$CH_3\dot{C}HOH + H_2O_2 \rightarrow CH_3CHO + H_2O + {}^{\bullet}OH$	2.0×10^5				chem.	Esr study in soln. contg. Ti(III), H_2O_2 and EtOH.	88D348
		2.8×10^5	6.8			γ-r.	Obs. $G(H_2O_2)$ in N_2O-satd. soln. contg. EtOH.	87G036
		1.6×10^5	2		297	chem.	Esr study in soln. contg. Ti(III), H_2O_2 and EtOH.	85Z383
		1.5×10^5				γ-r.	Calcd. from dose rate effect on $G(H_2O_2)$ in soln. contg. EtOH; used $2k(R + R) = 2.0 \times 10^9$ L $mol^{-1}\ s^{-1}$.	670094
13.54	**Oxygen**							
	$CH_3\dot{C}HOH + O_2 \rightarrow CH_3CH(OH)OO^{\bullet}$	4.6×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.1 mol L^{-1} EtOH; rel. to $k(CH_3\dot{C}HOH + Fe(CN)_6^{3-}) = 5.3 \times 10^9$ L $mol^{-1}\ s^{-1}$.	690522
13.55	**Lead(I) ions**							
	$CH_3\dot{C}HOH + Pb^+ \rightarrow PbCHOHCH_3^+$	1.7×10^9				p.r.	D.k. at 300 nm (Pb^+) in soln. contg. Pb^{2+} and EtOH, knowing initial [R] and [Pb^+]; cor. for R + R.	761170
13.56	**Tris(1,10-phenanthroline)rhodium(III) ion**							
	$CH_3\dot{C}HOH + Rh(phen)_3^{3+} \rightarrow$ addn. to ligand	2.5×10^9				p.r.	P.b.k. at 475 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} EtOH.	80A227
13.57	**Tris(2,2'-bipyridine)ruthenium(II) ion**							
	$CH_3\dot{C}HO^- + Ru(bpy)_3^{2+} \rightarrow CH_3CHO + Ru(bpy)_3^+$	3.6×10^9	13	0.1		p.r.	P.b.k. at 510 nm in N_2O-satd. soln. contg. EtOH.	91A218
		7.0×10^9	11-13			p.r.	P.b.k.	78A068
	$CH_3\dot{C}HOH + Ru(bpy)_3^{2+} \rightarrow$	$<10^6$	7			p.r.	No reduction.	78A068
13.58	**Tris(1,10-phenanthroline)ruthenium(II) ion**							
	$CH_3\dot{C}HO^- + Ru(phen)_3^{2+} \rightarrow CH_3CHO + Ru(phen)_3^+$	5.9×10^9	12			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.25 mol L^{-1} EtOH; $k = \sim 10^8$ L $mol^{-1}\ s^{-1}$ at pH 1.	80A227
13.59	**Hexaammineruthenium(III) ion**							
	$CH_3\dot{C}HOH + Ru(NH_3)_6^{3+} \rightarrow$	5.5×10^8	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} EtOH; *e*-transfer.	72A018
13.60	**Pentaammine(chloro)ruthenium(III) ion**							
	$CH_3\dot{C}HOH + Ru(NH_3)_5Cl^{2+} \rightarrow$	8.0×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} ethanol.	771100
13.61	**Hydrogen sulfide**							
	$CH_3\dot{C}HOH + H_2S \rightarrow H_2\dot{S}CHOHCH_3$		6			p.r.	Effect of [H_2S] on p.b.k. at 380 nm (complex). k(adduct → EtOH + ${}^{\bullet}SH$) = $4.6 \times 10^5\ s^{-1}$.	670262
13.62	**Hydrogen peroxomonosulfate ion**							
	$CH_3\dot{C}HOH + HSO_5^- \rightarrow$	2.1×10^6				chem.	Esr study in soln. contg. Ti(III) sulfate, H_2O_2, HSO_5^- and EtOH.	90D226

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
13.63	**Peroxodisulfate ion**							
	$CH_3\dot{C}HOH + S_2O_8^{2-} \rightarrow CH_3CHO + H^+ + SO_4^{\cdot-} + SO_4^{2-}$	6.9×10^5			~293	chem.	Esr study in soln. contg. 0.008 mol L^{-1} Ti(III), 0.01 mol L^{-1} H_2O_2, (0-0.025) mol L^{-1} $S_2O_8^{2-}$ and ~0.01 mol L^{-1} EtOH.	84D044
13.64	**Ethylenediaminetetraacetatotitanate(IV) ion**							
	$CH_3\dot{C}HOH + TiEDTA \rightarrow TiEDTA^- + CH_3CHO + H^+$	$\geq 10^8$	acid			phot.	Calcd. assuming various rate constants in soln. contg. $TiEDTA^-$ and H_2O_2.	82D287
13.65	**Thallium(I) ion**							
	$CH_3\dot{C}HO^- + Tl^+ \rightarrow Tl^0 + CH_3CHO$	4.7×10^8		0.01		p.r.	P.b.k. at 325, 420 and 450 nm in soln. contg. acetaldehyde, Tl^+ and $[OH^-] < 10^{-2}$ mol L^{-1}; $K = 0.43$.	89C001
		1.5×10^9	13			p.r.	P.b.k. at 420 nm in soln. contg. 0.1 mol L^{-1} EtOH and 2×10^{-4} mol L^{-1} Tl^+; no reaction in neutral or acid soln.	80A123
13.66	**Thallium(I) ion, complex with Tl(0)**							
	$CH_3\dot{C}HOH + Tl_2^+ + H^+ \rightarrow EtOH + Tl^+ + Tl^+$	3.0×10^9	6			p.r.	Calcd. from d.k. at 420 nm. and condy. changes in soln. contg. alcohol and Tl^+ assuming values for $2k(Tl_2^+ + Tl_2^+)$, $k(Tl_2^+ + H_2O_2)$ and $2k(R + R)$.	80A123
13.67	**Uranyl(VI) ion**							
	$CH_3\dot{C}HOH + UO_2^{2+} \rightarrow CH_3CHO + H^+ + UO_2^+$	$\leq 1 \times 10^8$				p.r.	D.k. in N_2O-satd. soln. contg. EtOH.	89A327
13.68	**12-Tungstoferrate ion(5-)**							
	$CH_3\dot{C}HOH + FeW_{12}O_{40}^{5-} \rightarrow CH_3CHO + H^+ + FeW_{12}O_{40}^{6-}$	2.0×10^9	5-6			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. EtOH.	82A271
13.69	**12-Tungstate ion(6-), dihydrogen**							
	$CH_3\dot{C}HOH + H_2W_{12}O_{40}^{6-} \rightarrow CH_3CHO + H^+ + H_2W_{12}O_{40}^{7-}$	2.3×10^8				p.r.	P.b.k. at 700 nm in soln. contg. 0.42 mol L^{-1} EtOH	90A069
		3.5×10^8	5-6			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. EtOH.	82A271
13.70	**12-Tungstophosphate ion(3-)**							
	$CH_3\dot{C}HOH + PW_{12}O_{40}^{3-} \rightarrow CH_3CHO + H^+ + PW_{12}O_{40}^{4-}$	5.9×10^9	~1			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. EtOH and $HClO_4$.	82A271
13.71	**12-Tungstosilicate ion(4-)**							
	$CH_3\dot{C}HOH + SiW_{12}O_{40}^{4-} \rightarrow CH_3CHO + H^+ + SiW_{12}O_{40}^{5-}$	3.8×10^9	5-6			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. EtOH.	82A271
13.72	**Diphosphooctadecatungstate ion(6-)**							
	$CH_3\dot{C}HOH + P_2W_{18}O_{62}^{6-} \rightarrow CH_3CHO + P_2W_{18}O_{62}^{7-} + H^+$	4.1×10^9	2		295	p.r.	P.b.k. in N_2O-satd. (2.5×10^{-2} mol L^{-1}) soln. contg. 0.5 mol L^{-1} EtOH and $\sim 10^{-4}$ mol L^{-1} heterotungstophosphate.	82A107
13.73	**Acetophenone**							
	$CH_3\dot{C}HO^- + C_6H_5COCH_3 \rightarrow CH_3CHO + C_6H_5\dot{C}O^-CH_3$	1.1×10^9	13			p.r.	P.b.k. at 440 nm in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH; pH dependent, k extrapolated to pH 14.	730122
13.74	**Acrylamide**							
	$CH_3\dot{C}HOH + H_2C{=}CHCONH_2 \rightarrow$ addn.	2.6×10^7	2-5			p.r.	C.k. in N_2O-satd. soln. contg. EtOH and Cu^{2+}; rel. to $k(CH_3\dot{C}HOH + Cu^{2+}) = 9.4 \times 10^7$ L mol^{-1} s^{-1}.	78A322

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.75	**Acrylate ion**							
	$CH_3\dot{C}HOH + CH_2{=}CHCO_2^- \rightarrow$ addn.	1.6×10^6	~9			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and EtOH; calcd. using $2k(R + R) = 2.3 \times 10^9$ L mol^{-1} s^{-1}.	93D265
13.76	**Adenine, conjugate acid**							
	$CH_3\dot{C}HOH + AH^+ \rightarrow$ addn.	4.3×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. EtOH.	94A368
13.77	**Adenosine, conjugate acid**							
	$CH_3\dot{C}HOH + AH^+ \rightarrow$ addn.	1.5×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. EtOH.	94A368
13.78	**Benzophenone**							
	$CH_3\dot{C}HO^- + (C_6H_5)_2CO \rightarrow CH_3CHO + (C_6H_5)_2\dot{C}O^-$	2.6×10^8	13			p.r.	P.b.k. at 610 nm in N_2O-satd. soln.	751125
		1×10^9	13			p.r.	P.b.k. at 610 nm in N_2O-satd. soln. contg. EtOH.	741010
13.79	**1,4-Benzoquinone**							
	$CH_3\dot{C}HOH + Q \rightarrow CH_3CHO + H^+ + Q^{\cdot-}$	4.2×10^9				γ-r.	C.k. in soln. contg. 1 mol L^{-1} H_2SO_4, 1.5×10^{-4} mol L^{-1} benzoquinone and EtOH with varied $[O_2]$; rel. to $k(CH_3\dot{C}HOH + O_2) = 4.6 \times 10^9$ L mol^{-1} s^{-1}.	86G034
		4.5×10^9				p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH.	710619
13.80	**Biacetyl**							
	$CH_3\dot{C}HOH + CH_3COCOCH_3 \rightarrow CH_3CHO + H^+ + [CH_3COCOCH_3]^{\cdot-}$	5.6×10^8				p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} EtOH.	680249
13.81	**3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy**							
	$CH_3\dot{C}HOH$ + NX-s →	4.3×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH; *e*-transfer.	761152
13.82	**3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy**							
	$CH_3\dot{C}HOH$ + NX-u →	6.2×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH; *e*-transfer.	761152
13.83	**4-Carboxy-1-methylpyridinium**							
	$CH_3\dot{C}HO^- + 4\text{-}py^+(CH_3)CO_2^- \rightarrow$	3.8×10^9	12.7			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	79A051
13.84	**1-Chloro-2-nitrobenzene**							
	$CH_3\dot{C}HOH + 2\text{-}ClC_6H_4NO_2 \rightarrow 2\text{-}ClC_6H_4NO_2\text{-}CHOHCH_3$	6.7×10^8				p.r.	P.b.k. at 305 nm in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH.	92A414
13.85	**Crotonic acid**							
	$CH_3\dot{C}HOH + CH_3CH{=}CHCO_2H \rightarrow$ addn.	1.8×10^6	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and EtOH; calcd. using $2k(R + R) = 2.3 \times 10^9$ L mol^{-1} s^{-1}.	93D265
13.86	**4-Cyanophenyl-*N*-*tert*-butylnitrone**							
	$CH_3\dot{C}HOH$ + 4-CN-PBN →	2.0×10^7				p.r.	C.k. in N_2O-satd. soln. contg. EtOH and *p*-nitroacetophenone; rel. to $k(CH_3\dot{C}HOH + PNAP) = 8 \times 10^8$ L mol^{-1} s^{-1}.	82A184

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.87	**Cysteamine, conjugate acid**							
	$CH_3\dot{C}HOH + H_3N^+CH_2CH_2SH \rightarrow EtOH + H_3N^+CH_2CH_2S^\bullet$	1.7×10^8	4.2			p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. EtOH, cysteamine and $ABTS^{2-}$; the latter reacts with $RS^\bullet$ to give $ABTS^{\bullet-}$ which is observed.	82A196
		1.4×10^8				p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O- satd. soln. contg. EtOH; $pK_a = 8.27, 10.53$.	680132
13.88	**2'-Deoxyadenosine, conjugate acid**							
	$CH_3\dot{C}HOH + dAH^+ \rightarrow$ addn.	3.1×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. EtOH.	94A368
13.89	**2'-Deoxyguanosine, conjugate acid**							
	$CH_3\dot{C}HOH + dGH^+ \rightarrow$ addn.	1.4×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. EtOH.	94A368
13.90	**1,6-Diazabicyclo[4.4.4]tetradecane radical cation**							
	$CH_3\dot{C}HOH + DABCT^{\bullet+} \rightarrow$	1.3×10^9	~4			p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol EtOH and $(0.2\text{-}12) \times 10^{-4}$ mol L^{-1} radical cation; 20% redn., 80% H abstr.; product analysis supported by condy. measurements.	86A272
13.91	**1,1'-Dibenzyl-4,4'-bipyridinium**							
	$CH_3\dot{C}HOH + BV^{2+} \rightarrow CH_3CHO + H^+ + BV^{\bullet+}$	2.3×10^9	8		293	p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} EtOH.	83A295
13.92	**3,5-Dibromo-4-nitrosobenzenesulfonate ion**							
	$CH_3\dot{C}HOH + DBNBS \rightarrow$	6.3×10^7	8.0-8.5			p.r.	C.k. rel. to $k(CH_3\dot{C}HOH + H_2TPPS^{4-}) = 5.2 \times 10^7$ L $mol^{-1}\ s^{-1}$.	92A304
13.93	**1,4-Dicyanobenzene**							
	$CH_3\dot{C}HOH + DCNB \rightarrow CH_3CHO + H^+ + [DCNB]^{\bullet-}$	3.7×10^8	~7			p.r.	P.b.k. at 345 nm in N_2O-satd. soln. contg. EtOH.	91A229
13.94	**(*E*)-4,5-Dihydroxy-1,2-dithiane**							
	$CH_3\dot{C}HO^- + \boxed{SSCH_2(CHOH)_2CH_2} \rightarrow CH_3CHO + \boxed{\dot{S}^-SCH_2(CHOH)_2CH_2}$	3.2×10^8 6.0×10^8 8.4×10^8	13.5		273 298 333	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. $(1\text{-}10) \times 10^{-4}$ mol L^{-1} DTT-ox and 0.1-0.5 mol L^{-1} ethanol; mechanism suggested to be addn. followed by decomp. to radical anion.	89A167
	$CH_3\dot{C}HOH + \boxed{SSCH_2(CHOH)_2CH_2} \rightarrow CH_3CHO + H^+ + \boxed{\dot{S}^-SCH_2(CHOH)_2CH_2}$	6×10^7	10.8			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} EtOH.	86A363
13.95	**3,3-Dimethylacrylic acid**							
	$CH_3\dot{C}HOH + (CH_3)_2C{=}CHCO_2H \rightarrow$ addn.	2×10^4	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and EtOH; calcd. using $2k(R + R) = 2.3 \times 10^9$ L $mol^{-1}\ s^{-1}$.	93D265
13.96	**1,1'-Dimethyl-4,4'-bipyridinium**							
	$CH_3\dot{C}HOH + MV^{2+} \rightarrow MV^{\bullet+} + CH_3CHO + H^+$	4×10^9	8		293	p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} EtOH.	83A295 82A399
13.97	***N,N*-Dimethyl-4-nitrosoaniline**							
	$CH_3\dot{C}HOH + 4\text{-}Me_2NC_6H_4NO \rightarrow$	2.4×10^9	7			p.r.	D.k. at 440 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} EtOH.	690156
		3.3×10^9				p.r.	D.k. at 440 nm in N_2O-satd. soln. contg. EtOH.	680066

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
13.98	**1,4-Dinitrobenzene**							
	$CH_3\dot{C}HOH + 1,4\text{-}C_6H_4(NO_2)_2 \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}NO_2$	2.4×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 94% electron transfer detd. from conductance method; $k = 5.3 \times 10^4\ s^{-1}$ for heterolysis of nitroxide to radical anion.	84A305
13.99	**1,2-Dithiolane-3-pentanoate ion (Lipoate ion)**							
	$CH_3\dot{C}HOH + RSSR \rightarrow RSSR^{\bullet-} + CH_3CHO + H^+$	1.0×10^8	7			p.r.	P.b.k. at 410 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	700560
13.100	**Dithiothreitol**							
	$CH_3\dot{C}HOH + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\bullet} + EtOH$	9.7×10^7	7.4			p.r.	P.b.k. at 390 nm ($DTT^{\bullet-}$) in N_2O-satd. soln. contg. dithiothreitol and ethanol.	87A250
		9.7×10^7	7.2		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N_2O-satd. soln. contg. DTT	87G007
13.101	**Eosin dianion**							
	$CH_3\dot{C}HOH + Eos \rightarrow CH_3CHO + H^+ + (Eos)^{\bullet-}$	1.1×10^9	8.5-9.0			p.r.	P.b.k. at 405 nm in soln. contg. 10^{-2} mol L^{-1} EtOH and 10^{-3} mol L^{-1} H_2O_2.	670038
13.102	**Fluorescein dianion**							
	$CH_3\dot{C}HOH + Fl^{2-} \rightarrow CH_3CHO + H^+ + Fl^{\bullet 3-}$	4.5×10^8	10.8			p.r.	D.k. at 500 nm in N_2O-satd. soln. contg. EtOH.	731078
13.103	**Fullerene-C_{60}-γ-cyclodextrin complex**							
	$CH_3\dot{C}HOH + \gamma\text{-}CD/C_{60} \rightarrow CH_3CHO + \gamma\text{-}CD/C_{60}^{\bullet-} + H^+$	1.4×10^8				p.r.	D.k. at 331 nm, as well as p.b.k. at 302 nm, in N_2O-satd. soln. contg. 10% EtOH.	93A433
13.104	**Glutathione**							
	$CH_3\dot{C}HOH + GSH \rightarrow GS^{\bullet} + EtOH$	1.1×10^8	8.4			p.r.	P.b.k. at 420 nm ($GSSG^{\bullet-}$) in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH and glutathione; see also [84A012].	82A193
13.105	**Guanine, conjugate acid**							
	$CH_3\dot{C}HOH + GH^+ \rightarrow$ addn.	1.8×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. EtOH.	94A368
13.106	**Guanosine, conjugate acid**							
	$CH_3\dot{C}HOH + GH+ \rightarrow$ addn.	1.8×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. *EtOH*.	94A368
13.107	**Hematoporphyrin IX**							
	$CH_3\dot{C}HO^- + HP \rightarrow CH_3CHO + HP^{\bullet-}$	7.0×10^8	13			p.r.	P.b.k. at 600-650 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	741040
13.108	**Hexafluorobenzene**							
	$CH_3\dot{C}HO^- + C_6F_6 \rightarrow CH_3CHO + C_6F_6^{\bullet-}$	2.5×10^6	14			p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. 50% EtOH and 1.0 mol L^{-1} KOH.	93A041
13.109	**1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole**							
	$CH_3\dot{C}HOH + (ImH)\text{-}NO_2 \rightarrow$	2×10^8				p.r.	D.k. at 320 nm in N_2O-satd. soln. contg. EtOH..	741135
13.110	**Hypoxanthine, conjugate acid**							
	$CH_3\dot{C}HOH + HxOH_2^+ \rightarrow$ addn.	2.2×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. EtOH.	94A368
13.111	**Inosine**							
	$CH_3\dot{C}HOH + Ino \rightarrow$ addn.	$\sim 5 \times 10^6$	6.5			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. EtOH.	94A368

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.112	**Inosine, conjugate acid**							
	$CH_3\dot{C}HOH + InoH^+ \rightarrow$ addn.	3.0×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. EtOH.	94A368
13.113	**Lipoamide**							
	$CH_3\dot{C}HOH + LS_2 \rightarrow LS_2^{\cdot-} + CH_3CHO + H^+$	1.6×10^8	10.8			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} EtOH.	86A363
		1.1×10^8	5			p.r.	P.b.k. at 400 nm in soln. contg. 0.1 mol L^{-1} EtOH. Lipoamide radical anion is formed from intermediate (addn. prod.?) which also decays to another product (half-life 1.3-3.2 × 10^{-4} s).	84A011
		1.0×10^8	6					
		1.0×10^8	7					
		0.8×10^8	9					
13.114	**Lumiflavine**							
	$CH_3\dot{C}HOH + LF \rightarrow CH_3CHO + LFH^{\cdot}$	2.6×10^9	7		297	p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. ethanol.	83A073
13.115	**Lumiflavine semiquinone**							
	$CH_3\dot{C}HOH + LFH^{\cdot} \rightarrow$	1.2×10^9	7		297	p.r.	Abs. changes at 550 nm; decay to LFH^- and LF_o from calcd. concn.-time profile.	83A073
13.116	**2-Mercaptoethanol**							
	$CH_3\dot{C}HOH + HSCH_2CH_2OH \rightarrow EtOH + {}^{\cdot}SCH_2CH_2OH$	2.3×10^8	10			p.r.	P.b.k. ($RSSR^-$) in N_2O-satd. soln. *contg. 0.1* mol L^{-1} EtOH.	*690553*
13.117	**4-Methoxyphenyl-*N*-*tert*-butylnitrone**							
	$CH_3\dot{C}HOH$ + 4-CH_3O-PBN →	9×10^6				p.r.	C.k. in N_2O-satd. soln. contg. EtOH and *p*-nitroacetophenone; rel. to $k(CH_3\dot{C}HOH + PNAP) = 8 \times 10^8$ L $mol^{-1}\ s^{-1}$.	82A184
13.118	**2-Methyl-1,4-naphthoquinone**							
	$CH_3\dot{C}HOH$ + 2-$CH_3NQ \rightarrow CH_3CHO + H^+ + [2\text{-}CH_3NQ]^{\cdot-}$	3.8×10^9	7.0			p.r.	P.b.k. at 395 nm in soln. contg. 0.05 mol L^{-1} EtOH; 90% *e*-transfer.	*731047*
	$CH_3\dot{C}HO^- + 2\text{-}CH_3NQ \rightarrow CH_3CHO + [2\text{-}CH_3NQ]^{\cdot-}$	4.2×10^9	12.5			p.r.	P.b.k. at 395 nm in soln. contg. 0.05 mol L^{-1} EtOH; 92% *e*-transfer.	*731047*
13.119	**Methyl 4-nitrobenzenesulfonate**							
	$CH_3\dot{C}HOH + 4\text{-}O_2NC_6H_4SO_3CH_3 \rightarrow CH_3CH(OH)ON(O)C_6H_4\text{-}4\text{-}SO_3CH_3$	1.3×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH; 81% electron transfer detd. from conductance method; $k = 1.2 \times 10^4\ s^{-1}$ for heterolysis of nitroxide to radical anion.	84A305
13.120	**Methyl 4-nitrobenzoate**							
	$CH_3\dot{C}HOH + 4\text{-}O_2NC_6H_4CO_2CH_3 \rightarrow CH_3CH(OH)ON(O)C_6H_4\text{-}4\text{-}CO_2CH_3$	8.5×10^8	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 81% electron transfer detd. from conductance method; $k = 8.1 \times 10^3\ s^{-1}$ for heterolysis of nitroxide to radical anion.	84A305
13.121	**2-Methyl-2-nitrosopropane**							
	$CH_3\dot{C}HOH + (CH_3)_3CNO \rightarrow$ addn.	3.2×10^8	~7		~291	p.r.	P.b.k. (esr) in unbuffered N_2O-satd. soln. contg. 0.25 mol L^{-1} ethanol and (0.25-15) × 10^{-3} mol L^{-1} MNP (assuming complete dimer dissociation).	91D097
13.122	**4-Methylphenyl-*N*-*tert*-butylnitrone**							
	$CH_3\dot{C}HOH$ + 4-CH_3-PBN →	1×10^6				p.r.	C.k. in N_2O-satd. soln. contg. EtOH and *p*-nitroacetophenone; rel. to $k(CH_3\dot{C}HOH + PNAP) = 8 \times 10^8$ L $mol^{-1}\ s^{-1}$.	82A184
13.123	**3-Methylpterin**							
	$CH_3\dot{C}HOH$ + 3-MPT →	3.2×10^7	6.3			p.r.	P.b.k. in N_2O-satd. soln. contg. EtOH; 55% *e*-transfer.	*761060*

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.124	**9-Methylpurine**							
	$CH_3\dot{C}HO^- + 9\text{-MP} \rightarrow 9\text{-MP}^{\bullet-}$	5.1×10^8	13.6			p.r.	P.b.k.; N_2O-satd. soln. contg. EtOH.	751060
	$CH_3\dot{C}HOH + 9\text{-MP} \rightarrow 9\text{-MPH}^{\bullet}$	$<2 \times 10^7$	8.2			p.r.	P.b.k.; N_2O-satd. soln. contg. EtOH.	751060
13.125	**Nifuroxime**							
	$CH_3\dot{C}HOH + NF \rightarrow NF^{\bullet-} + CH_3CHO + H^+$	$>1.5 \times 10^9$	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} EtOH; > 75% e^- transfer.	731099
13.126	**4-Nitroacetophenone**							
	$CH_3\dot{C}HOH + PNAP \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}COCH_3$	1.0×10^9	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 84% electron transfer detd. from conductance method; $k = 1.5 \times 10^4\ s^{-1}$ for heterolysis of nitroxide to radical anion; $\Delta H\ddagger = 8.9\ kJ\ mol^{-1}$, $\Delta S\ddagger = -42\ J\ K^{-1}\ mol^{-1}$ studied at 273-333 K.	84A305 88A099
		8×10^8	11			p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. EtOH.	730122
13.127	**4-Nitroanisole**							
	$CH_3\dot{C}HOH + 4\text{-}CH_3OC_6H_4NO_2 \rightarrow 4\text{-}CH_3OC_6H_4N(\dot{O})OCHOHCH_3$	1.1×10^8	4-5		293	p.r.	Condy. changes in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 35% electron transfer detd. from conductance method; $k = 8 \times 10^2\ s^{-1}$ for heterolysis of nitroxide to radical anion.	84A305
13.128	***p*-Nitrobenzaldehyde**							
	$CH_3\dot{C}HOH + 4\text{-}O_2NC_6H_4CHO \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}CHO$	1.8×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH.	84A305
13.129	**4-Nitrobenzaldoxime**							
	$CH_3\dot{C}HOH + HON\text{-}CHC_6H_4\text{-}4\text{-}NO_2 \rightarrow HN{=}COHC_6H_4N(\dot{O})OCH(OH)CH_3$	6.5×10^8	4-5		293	p.r.	Condy. changes in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 60% electron transfer detd. from conductance method; $k = 4.0 \times 10^3\ s^{-1}$ for heterolysis of nitroxide to radical anion.	84A305
13.130	**4-Nitrobenzamide**							
	$CH_3\dot{C}HOH + 4\text{-}O_2NC_6H_4CONH_2 \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}CONH_2$	4.3×10^8	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 75% electron transfer detd. from conductance method; $k = 6.3 \times 10^3\ s^{-1}$ for heterolysis of nitroxide to radical anion; $\Delta H\ddagger = 6.5\ kJ\ mol^{-1}$, $\Delta S\ddagger = -54.5\ J\ K^{-1}\ mol^{-1}$ studied at 273-333 K.	84A305 88A099
13.131	**Nitrobenzene**							
	$CH_3\dot{C}HOH + C_6H_5NO_2 \rightarrow$	2.4×10^8	5-6			p.r.	N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	72A018
		3.3×10^8	7			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	660432
	$CH_3\dot{C}HO^- + C_6H_5NO_2 \rightarrow CH_3CHO + [C_6H_5NO_2]^{\bullet-}$	3×10^9	13			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. EtOH.	741010
		3.1×10^9	13			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	660432
13.132	**4-Nitrobenzenesulfonamide**							
	$CH_3\dot{C}HOH + 4\text{-}O_2NC_6H_4SO_2NH_2 \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}SO_2NH_2$	7.9×10^8	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 80% electron transfer detd. from conductance method; $k = 8.1 \times 10^3\ s^{-1}$ for heterolysis of nitroxide to radical anion.	84A305

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
13.133	**4-Nitrobenzenesulfonate ion**							
	$CH_3\dot{C}HOH + 4\text{-}O_2NC_6H_4SO_3^- \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}SO_3^-$	6.0×10^8	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 64% electron transfer detd. from optical method; $k = 4.7 \times 10^3\ s^{-1}$ for heterolysis of nitroxide to radical anion. $\Delta H‡ = 5.4$ kJ mol^{-1}, $\Delta S‡ = -60.5$ J K^{-1} mol^{-1} studied at 273-333 K.	84A305 88A099
13.134	**4-Nitrobenzoate ion**							
	$CH_3\dot{C}HOH + 4\text{-}NO_2C_6H_4CO_2^- \rightarrow {}^-O_2C\text{-}p\text{-}C_6H_4N(\dot{O})OCHOHCH_3$	5.9×10^8	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 61% electron transfer; $k = 3.6 \times 10^3\ s^{-1}$ for heterolysis of nitroxide to radical anion.	84A305
13.135	**4-Nitrobenzonitrile**							
	$CH_3\dot{C}HOH + 4\text{-}O_2NC_6H_4CN \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}CN$	1.2×10^9	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 77% electron transfer detd. from conductance method; $k = 1.0 \times 10^4\ s^{-1}$ for heterolysis of nitroxide to radical anion. $\Delta H‡ = 7.3$ kJ mol^{-1}, $\Delta S‡ = -45$ J K^{-1} mol^{-1} studied at 273-333 K.	84A305 88A099
13.136	**4-Nitrophenol**							
	$CH_3\dot{C}HOH + 4\text{-}O_2NC_6H_4OH \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}OH$	7.0×10^7	4-5		293	p.r.	Condy. changes in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 40% electron transfer detd. from conductance method; $k = 4 \times 10^2\ s^{-1}$ for heterolysis of nitroxide to radical anion.	84A305
13.137	**4-Nitrophenyl-*N*-*tert*-butylnitrone**							
	$CH_3\dot{C}HOH + 4\text{-}NO_2\text{-}PBN \rightarrow$	3.5×10^7				p.r.	C.k. in N_2O-satd. soln. contg. EtOH and *p*-nitroacetophenone; rel. to $k(CH_3\dot{C}HOH + PNAP) = 8 \times 10^8$ L mol^{-1} s^{-1}.	82A184
13.138	**Nitrosobenzene**							
	$CH_3\dot{C}HO^- + C_6H_5NO \rightarrow CH_3CHO + C_6H_5\dot{N}O^-$	6.4×10^9	13.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} EtOH.	660433
	$CH_3\dot{C}HOH + C_6H_5NO \rightarrow CH_3CHO + C_6H_5\dot{N}OH$	3.9×10^9	7.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} EtOH.	660433
13.139	**4-Nitrotoluene**							
	$CH_3\dot{C}HOH + 4\text{-}CH_3C_6H_4NO_2 \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}CH_3$	1.5×10^8	4-5		293	p.r.	Condy. changes in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 28% electron transfer detd. from conductance method; $k = 7 \times 10^2\ s^{-1}$ for heterolysis of nitroxide to radical anion.	84A305
13.140	***p*-Nitro-α,α,α-trifluorotoluene**							
	$CH_3\dot{C}HOH + 4\text{-}CF_3C_6H_4NO_2 \rightarrow CH_3CH(OH)ON(\dot{O})C_6H_4\text{-}4\text{-}CF_3$	4.3×10^8	4-6		293	p.r.	Condy. changes in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH. 70% electron transfer detd. from conductance method; $k = 6.8 \times 10^3\ s^{-1}$ for heterolysis of nitroxide to radical anion; $\Delta H‡ = 9.1$ kJ mol^{-1}, $\Delta S‡ = -47$ J K^{-1} mol^{-1} studied at 273-333 K.	84A305 88A099
13.141	**1,10-Phenanthroline**							
	$CH_3\dot{C}HO^- + phen \rightarrow CH_3CHO + H^+ + phenH^\bullet$	8×10^8	~13			p.r.	P.b.k. at 490 nm in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH.	80A115
13.142	**Phenyl-*N*-*tert*-butylnitrone**							
	$CH_3\dot{C}HOH + PBN \rightarrow$	1.6×10^7				p.r.	C.k. in N_2O-satd. soln. contg. EtOH and *p*-nitroacetophenone; rel. to $k(CH_3\dot{C}HOH + PNAP) = 8 \times 10^8$ L mol^{-1} s^{-1}.	82A184

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$).	pH	I	T(K)	Method	Comment	Ref.
13.143	**Pterin**							
	$CH_3\dot{C}HOH + PnH \rightarrow$	3.7×10^7	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. EtOH; ~40% *e*-transfer.	761060
13.144	**Pterin, conjugate base**							
	$CH_3\dot{C}HO^- + Pn^- \rightarrow$	1.2×10^9	13.0			p.r..	P.b.k. in N_2O-satd. soln. contg. EtOH; 100% *e*-transfer	761060
13.145	**Pyrene**							
	$CH_3\dot{C}HO^- + Py \rightarrow CH_3CHO + Py^{\bullet -}$	1.7×10^8	13			p.r.	P.b.k. at 495 nm in micellar soln. contg. 0.2 mol L^{-1} EtOH and 10^{-3} mol L^{-1} pyrene solubilized by 5×10^{-3} mol L^{-1} hexadecyl trimethylammonium bromide; after photolysis $k(R + {}^3Py) = 8 \times 10^9$ L $mol^{-1}\ s^{-1}$.	761062
13.146	**Quinoxaline**							
	$CH_3\dot{C}HOH + Qx \rightarrow CH_3CHO + {}^{\bullet}QxH$	6.5×10^7	6.5			p.r.	P.b.k. in N_2O-satd. soln. contg. EtOH; 70% *e*-transfer.	741127
13.147	**Tetrachloro-1,4-benzoquinone**							
	$CH_3\dot{C}HOH + Cl_4Q \rightarrow CH_3CHO + H^+ + Cl_4Q^{\bullet -}$	3×10^9				p.r.	P.b.k. in CTAB or NaLS micelles: soln. contains 0.1 mol L^{-1} EtOH; cor. for e_{aq}^- reaction.	761104
13.148	**1,2,4,5-Tetracyanobenzene**							
	$CH_3\dot{C}HOH + 1,2,4,5\text{-}C_6H_2(CN)_4 \rightarrow$ *e*-transfer	3.5×10^9				p.r.	P.b.k. in CTAB or NaLS micelles; soln. contains 0.1 mol L^{-1} EtOH; cor. for e_{aq}^- reaction.	761104
13.149	**Tetrafluoro-1,4-benzoquinone**							
	$CH_3\dot{C}HOH + F_4Q \rightarrow CH_3CHO + H^+ + F_4Q^{\bullet -}$	3.5×10^9	4.8			p.r.	P.b.k. at 435 nm in N_2O-satd. soln. contg. 1 mol L^{-1} EtOH.	94A417
13.150	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine**							
	$CH_3\dot{C}HOH + H_2TPPS^{4-} \rightarrow$	5.2×10^7	8.0-8.5			p.r.	P.b.k.	92A304
13.151	**2,2,6,6-Tetramethylpiperidine-*N*-oxyl**							
	$CH_3\dot{C}HOH + TMPN \rightarrow$	4.9×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH; *e*-transfer.	761067
13.152	**2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl**							
	$CH_3\dot{C}HOH + TAN \rightarrow$	4.0×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH; *e*-transfer.	761067
		6.4×10^8	5-6			p.r.	C.k. in N_2O-satd. soln. contg. EtOH; rel. to $k(CH_3\dot{C}HOH + Fe(CN)_6^{3-}) = 5.3 \times 10^9$ L $mol^{-1}\ s^{-1}$.	710618
13.153	**Tetranitromethane**							
	$CH_3\dot{C}HOH + C(NO_2)_4 \rightarrow CH_3CHO + {}^{\bullet}NO_2 + H^+ + C(NO_2)_3^-$	$\sim 3.5 \times 10^9$				p.r.	P.b.k. in micellar soins. contg. 0.1 mol L^{-1} EtOH and either 0.1 mol L^{-1} Na dodecyl sulfate or 0.02 mol L^{-1} dodecyltrimethylammonium chloride.	761104
		5.6×10^9	~1			p.r.	P.b.k. at 366 nm in soln. contg. 0.5 mol L^{-1} EtOH.	650183
13.154	**Thionine cation**							
	$CH_3\dot{C}HOH + Th^+ \rightarrow {}^{\bullet}Th + CH_3CHO + H^+$	4.9×10^9	6.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH and 10^{-4} mol L^{-1} thionine.	87A451

TABLE 13. 1-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	$T(K)$	Method	Comment	Ref.
13.155	**Thymine**							
	$CH_3\dot{C}HOH + 5\text{-MeU} \rightarrow$	7.7×10^7	7			X-r.	C.k.; obs. effect of [EtOH] on G(-T) in aerated soln.; rel. to $k(CH_3\dot{C}HOH + O_2) = 4.6 \times 10^9$ L mol^{-1} s^{-1}.	680359
13.156	**Toluidine Blue cation**							
	$CH_3\dot{C}HOH + TB^+ \rightarrow [TBH]^{\cdot+} + CH_3CHO$	4.0×10^9	6.8			p.r.	P.b.k. at 830 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	89A262
13.157	**Albumin (serum)**							
	$CH_3\dot{C}HOH + C_{99} \rightarrow$ e.t.	1.3×10^8	7.3			p.r.	P.b.k. at 420 nm in soln. contg. 0.1 mol L^{-1} EtOH and 10^{-3} mol L^{-1} phosphate buffer; -S$\dot{S}$- radical formn.	83A083
13.158	**Cytochrome C_3**							
	$CH_3\dot{C}HOH + cyt\ C_3 \rightarrow$	6×10^8	~3		293	p.r.	Abs. changes following e_{aq}^- reaction in soln. contg. EtOH.	82A399
13.159	**Cytochrome C**							
	$CH_3\dot{C}HOH + Cyt\ C\ (Fe^{3+}) \rightarrow Cyt\ C\ (Fe^{2+})$	1.4×10^8	7			p.r.	Abs. changes at 550 and 435 nm in N_2O-satd. soln. contg. EtOH; 100% redn.	79A153
		1.8×10^8	~7			p.r.	Abs. changes at 550 and 450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH; see also [741007].	79A312
		2.4×10^8 1.8×10^8	2.0 6.8			p.r.	Abs. changes in range 400-750 nm.	771128
13.160	**Cytochrome C, acetylated**							
	$CH_3\dot{C}HOH + Ac\text{-}cyt\ C \rightarrow$	2.5×10^8	~7	0.005		p.r.	Abs. changes at 550 and 450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	79A312
13.161	**Cytochrome C, carboxymethylated**							
	$CH_3\dot{C}HOH + Cxm\text{-}cyt\ C \rightarrow$	3.5×10^8	~7			p.r.	Abs. changes at 550 nm and 450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	79A312
13.162	**Cytochrome C, succinylated**							
	$CH_3\dot{C}HOH + Succ\text{-}cyt\ C \rightarrow$	1.8×10^9	~7			p.r.	Abs. changes at 550 and 450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EtOH.	79A312
13.163	***Flavodoxin***							
	$CH_3\dot{C}HOH + C_{99} \rightarrow CH_3CHO + H^+ + FldH$	1.7×10^8	8		293	p.r.	P.b.k.	83A295
13.164	***Methemoglobin***							
	$CH_3\dot{C}HOH + Fe^{3+}\ Hb \rightarrow CH_3CHO + H^+ + Fe^{2+}\ Hb$	4.0×10^7	7			p.r.	Abs. changes at 550 and 435 nm in N_2O-satd. soln. contg. EtOH; 100% redn.	79A153
13.165	**Metmyoglobin**							
	$CH_3\dot{C}HOH + Fe^{3+}Mb \rightarrow$	5.5×10^7	7			p.r.	Abs. changes at 550 and 435 nm in N_2O-satd. soln. contg. EtOH; 95% redn. of hemoprotein.	79A153

TABLE 14. 2-Hydroxyethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
14.1	**3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion**							
	$^{\bullet}CH_2CH_2OH + Co(tspc)^{4-} \rightarrow HOCH_2CH_2Co(tspc)^{4-}$	$\geq 5 \times 10^9$	6.1			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene and $Co(tspc)^{4-}$; k calcd. assuming complex is monomer.	89A150
14.2	**Chromium(II) ion**							
	$^{\bullet}CH_2CH_2OH + Cr^{2+} \rightarrow CrCH_2CH_2OH^{2+}$	9.9×10^7	~3		293	p.r.	N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and ethylene; $\Delta V‡ = 4.0\ cm^3\ mol^{-1}$ studied at 0.1-150 MPa.	92A361
		1.8×10^8	0-5			p.r.	P.b.k. in soln. contg. $(1\text{-}20) \times 10^{-4}$ mol L^{-1} Cr^{2+}, satd. with ethylene/N_2O.	91A477
14.3	**Copper(I) ion**							
	$^{\bullet}CH_2CH_2OH + Cu^+ \rightarrow CuCH_2CH_2OH^+$	1.9×10^{10}	4.5			p.r.	Estd. from p.b.k. in N_2O-satd. soln. contg. ethylene and Cu^{2+}. Final products are $Cu^{2+} + C_2H_4 + OH^-$.	78A322
14.4	**Ethylene-copper(I) complex**							
	$^{\bullet}CH_2CH_2OH + Cu(C_2H_4)^+ \rightarrow 2\ H_2C{=}CH_2 + Cu^{2+} + OH^-$	7.8×10^7	4.5			p.r.	Estd. from effect of $[C_2H_4]$ on rate of formn. and decay of $CuC_2H_4^+$ at 227 nm; radical from $^{\bullet}OH$ + ethylene.	78A322
14.5	**Copper(II) ion**							
	$^{\bullet}CH_2CH_2OH + Cu^{2+} \rightarrow CuCH_2CH_2OH^{2+}$	3×10^7	6			p.r.	P.b.k. in soln. contg. $(1\text{-}5) \times 10^{-4}$ $CuSO_4$, satd. with ethylene-N_2O(1:1).	80A277
		1.9×10^7 2.2×10^7	4.5 2			p.r.	P.b.k. at 270 nm ($Cu^IC_2H_4$) in N_2O-satd. soln. 0.001 mol L^{-1} ethylene; $^{\bullet}C_2H_5$ is present at pH 4.5 (~ 10%) and pH 2 (~ 50%). Final product is Cu^+.	78A322
14.6	**Iron(II) protoporphyrin**							
	$^{\bullet}CH_2CH_2OH + Fe(II)PP \rightarrow HOCH_2CH_2Fe(III)PP$	6×10^8	10-13			p.r.	P.b.k. in with N_2O/ethylene (1:9) satd. soln. contg. $(1\text{-}3) \times 10^{-5}$ mol L^{-1} Fe(II)PP.	86A511
14.7	**Tris(1,10-phenanthroline)iron(III) ion**							
	$^{\bullet}CH_2CH_2OH + Fe(phen)_3^{3+} \rightarrow$ redn.	1.5×10^8	~1			p.r.	P.b.k. at 490 nm in soln. contg. ethylene; faster reaction assigned to $^{\bullet}CH_2CH_3$ + complex; probably inner-sphere mechanism.	85A284
14.8	**Ferricyanide ion**							
	$^{\bullet}CH_2CH_2OH + Fe(CN)_6^{3-} \rightarrow$	$\sim 10^7$	7			p.r.	D.k. in soln. contg. 0.01 mol L^{-1} ethylene and 0.01 mol L^{-1} N_2O.	690522
14.9	**Hexachloroiridate(IV) ion**							
	$^{\bullet}CH_2CH_2OH + IrCl_6^{2-} \rightarrow IrCl_6^{3-}$ + other prod.	$\sim 2 \times 10^9$	4-6		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. ethylene.	82A041
14.10	**Oxygen**							
	$^{\bullet}CH_2CH_2OH + O_2 \rightarrow HOCH_2CH_2OO^{\bullet}$	6.6×10^9	1			p.r.	P.b.k. at 240 nm; radical from OH addn. in soln. contg. ethylene-O_2 (99:1); includes O_2 reaction with $^{\bullet}C_2H_5$ from H addn.	670269
14.11	**3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy**							
	$^{\bullet}CH_2CH_2OH$ + NX-u → addn.	4.8×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01-0.1 mol L^{-1} ethylene.	761152
14.12	**3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy**							
	$^{\bullet}CH_2CH_2OH$ + NX-s → addn.	4.7×10^8	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.01-0.1 mol L^{-1} ethylene.	761152

TABLE 14. 2-Hydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
14.13	**Ethanol**							
	$^{\bullet}CH_2CH_2OH + EtOH \rightarrow CH_3\dot{C}HOH + EtOH$	1.6×10^1				γ-r.	Calcd. from obs. yields and assumed mechanism in oxid. of EtOH by H_2O_2.	700338
14.14	**Ethylene**							
	$^{\bullet}CH_2CH_2OH + H_2C{=}CH_2 \rightarrow {}^{\bullet}CH_2CH_2CH_2CH_2OH$	3×10^4				γ-r.	Calcd. from dose rate effect on yields of α,ω-diols in N_2O-satd. soln. contg. ethylene assuming termination rate constant of chain reaction is $5 \times 10^8\ L\ mol^{-1}\ s^{-1}$.	80A054
		1.6×10^6 4.1×10^6	4.5 2			p.r.	C.k. in N_2O-satd. soln.; rel. to $k(^{\bullet}CH_2CH_2OH + Cu^{2+}) = 1.9 \times 10^7$ and $2.2 \times 10^7\ L\ mol^{-1}\ s^{-1}$ at pH 4.5 and 2, resp. Radical from $^{\bullet}OH$ + ethylene; contains ~10% (pH 4.5) and ~50% (pH 2) $^{\bullet}C_2H_5$.	78A322
14.15	**2-Mercaptoethanol**							
	$^{\bullet}CH_2CH_2OH + HSCH_2CH_2OH \rightarrow EtOH + {}^{\bullet}SCH_2CH_2OH$	4.7×10^7	10			p.r.	P.b.k. ($RSSR^-$) in Ar-satd. soln.; radical from $e_{aq}^- + HO(CH_2)_2SH$.	690553

TABLE 15. 1-Hydroxypropyl

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T (K)	Method	Comment	Ref.
15.1	**Tris(1,10-phenanthroline)iron(III) ion**							
	$CH_3CH_2\dot{C}HOH + Fe(phen)_3^{3+} \rightarrow C_2H_5CHO + Fe(phen)_3^{2+} + H^+$	3.2×10^9	~1			p.r.	P.b.k. at 490 nm in soln. contg. 0.1-1 mol L^{-1} 1-PrOH and (0.4-1.0) $\times 10^{-4}$ mol L^{-1} complex; a slower reaction (~ 7×10^8 L mol^{-1} s^{-1}) was also obs., probably from $CH_3\dot{C}HCH_2OH$.	85A284
15.2	**Ferricyanide ion**							
	$CH_3CH_2\dot{C}HOH + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-}$	3.7×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.1 mol L^{-1} 1-PrOH.	690522
15.3	**Oxygen**							
	$CH_3CH_2\dot{C}HOH + O_2 \rightarrow CH_3CH_2CH(OH)OO^{\bullet}$	4.7×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.1 mol L^{-1} 1-PrOH; rel. to $k(CH_3CH_2\dot{C}HOH + Fe(CN)_6^{3-}) = 3.7 \times 10^9$ L mol^{-1} s^{-1}.	690522
15.4	**Hydrogen sulfide**							
	$CH_3CH_2\dot{C}HOH + H_2S \rightleftarrows H_2S\dot{C}HOHCH_2CH_3$		6			p.r.	Effect of [H_2S] on p.b.k. at 380 nm; $K = 5.7 \times 10^{-4}$ L mol^{-1}; k(adduct → 1-PrOH + $^{\bullet}$SH) = 3.8×10^5 s^{-1}.	670262
15.5	**Biacetyl**							
	$CH_3CH_2\dot{C}HOH + CH_3COCOCH_3 \rightarrow C_2H_5CHO + H^+ + [CH_3COCOCH_3]^{\bullet-}$	6.8×10^8				p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 1-PrOH.	680249
15.6	**4-Cyanophenyl-*N*-*tert*-butylnitrone**							
	$CH_3CH_2\dot{C}HOH$ + 4-CN-PBN →	*1.7×10^7*				*p.r.*	*C.k. in N_2O-satd. soln. contg. 1-PrOH and p-nitroacetophenone; rel. to $k(^{\bullet}CHOHCH_2CH_3 + PNAP) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.*	82A184
15.7	**Glutathione**							
	$CH_3CH_2\dot{C}HOH + GSH \rightarrow GS^{\bullet} + 1\text{-PrOH}$	1.4×10^8				p.r.	P.b.k. at 420 nm in N_2O-satd. soln. contg. 1-PrOH and glutathione.	88A144
15.8	**4-Methoxyphenyl-*N*-*tert*-butylnitrone**							
	$CH_3CH_2\dot{C}HOH$ + 4-CH_3O-PBN →	1×10^6				p.r.	C.k. in N_2O-satd. soln. contg. 1-PrOH and p-nitroacetophenone; rel. to $k(^{\bullet}CHOHCH_2CH_3 + PNAP) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	82A184
15.9	**2-Methyl-2-nitrosopropane**							
	$CH_3CH_2\dot{C}HOH + (CH_3)_3CNO \rightarrow$ addn.	1.3×10^8	~7		~291	p.r.	P.b.k. (esr) in unbuffered N_2O-satd. soln. contg. 0.25 mol L^{-1} 1-PrOH and (0.25-15) $\times 10^{-3}$ mol L^{-1} MNP (assuming complete dimer dissociation).	91D097
15.10	**4-Methylphenyl-*N*-*tert*-butylnitrone**							
	$CH_3CH_2\dot{C}HOH$ + 4-CH_3-PBN →	3.5×10^6				p.r.	C.k. in N_2O-satd. soln. contg. 1-PrOH and p-nitroacetophenone; rel. to $k(^{\bullet}CHOHCH_2CH_3 + PNAP) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	82A184
15.11	**Nifuroxime**							
	$CH_3CH_2\dot{C}HOH + NF \rightarrow NF^{\bullet-} + CH_3CH_2CHO + H^+$	3.2×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1-PrOH; 52% *e*-transfer.	731062
		3.2×10^9	7			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. 1-PrOH; 95% *e*-transfer.	*731099*
15.12	**4-Nitroacetophenone**							
	$CH_3CH_2\dot{C}HOH + PNAP \rightarrow$	2.4×10^9	7			p.r.	P.b.k. at 360 and 550 nm in N_2O-satd. soln. contg. 1-PrOH; 45% *e*-transfer.	731062

TABLE 15. 1-Hydroxypropyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
15.13	**Nitrobenzene**							
	$CH_3CH_2\dot{C}HOH + C_6H_5NO_2 \rightarrow C_2H_5CHO + H^+ + [C_6H_5NO_2]^{\cdot-}$	1.0×10^9	7			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 1-PrOH; 60% e-transfer.	731062
		3.5×10^8	7			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1-PrOH; 68% e- transfer.	660432
15.14	**4-Nitrophenyl-*N*-*tert*-butylnitrone**							
	$CH_3CH_2\dot{C}HOH$ + 4-NO_2-PBN →	6.5×10^6				p.r.	C.k. in N_2O-satd. soln. contg. 1-PrOH and p-nitroacetophenone; rel. to $k(^{\cdot}CHOHCH_2CH_3 + PNAP) = 2.4 \times 10^9$ L $mol^{-1}\ s^{-1}$.	82A184
15.15	**Nitrosobenzene**							
	$CH_3CH_2\dot{C}HOH + C_6H_5NO \rightarrow C_2H_5CHO + C_6H_5\dot{N}OH$	4.0×10^9	7.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 1-PrOH; includes β-alcohol radical reaction.	660433
15.16	**Phenyl-*N*-*tert*-butylnitrone**							
	$CH_3CH_2\dot{C}HOH$ + PBN →	1.3×10^7				p.r.	C.k. in N_2O-satd. soln. contg. 1-PrOH and p-nitroacetophenone; rel. to $k(^{\cdot}CHOHCH_2CH_3 + PNAP) = 2.4 \times 10^9$ L $mol^{-1}\ s^{-1}$.	82A184
15.17	**Tetranitromethane**							
	$CH_3CH_2\dot{C}HOH + C(NO_2)_4 \rightarrow C_2H_5CHO + {}^{\cdot}NO_2 + H^+ + C(NO_2)_3^-$	4.7×10^9				p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1-PrOH.	640133

TABLE 16. 1-Hydroxy-1-methylethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.1	**1-Hydroxy-1-methylethyl**							
	$(CH_3)_2\dot{C}OH + (CH_3)_2\dot{C}OH \rightarrow$	3.8×10^8				p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. 2-PrOH.	86A409
		4.9×10^8	<10	0.1		f.p./rq	D.k. (esr) in soln. contg. 1.3 mol L^{-1} 2-PrOH and 0.6 mol L^{-1} acetone; studied at pH 1 to 13; equation describing pH dependence presented.	84A257
		6.5×10^8	9	0.0015	298	f.p./rq	D.k. (esr) in soln. contg. 0.6 mol L^{-1} acetone, 1.3 mol L^{-1} 2-PrOH; $E_a = 18.1$ kJ mol^{-1}, log $A = 12.3$, studied at 283-349 K.	83A159
		6.5×10^8				p.r.	D.k. at 310 nm in N_2O-satd. soln. contg. 0.02 mol L^{-1} 2-PrOH; $\varepsilon = 353$ L mol^{-1} cm^{-1}.	771011
		7×10^8	6			p.r.	D.k. at 280 nm in N_2O-satd. soln. contg. 2-PrOH; $2k/\varepsilon = 2.1 \times 10^6$ cm s^{-1}; $pK_a = 12.2$ [660074].	690419
16.2	**Acetone ketyl radical**							
	$(CH_3)_2\dot{C}O^- + (CH_3)_2\dot{C}O^- \rightarrow$	1.2×10^8	>13	0.1		f.p./rq	D.k. (esr) in soln. contg. 0.6 mol L^{-1} acetone, 1.3 mol L^{-1} 2-PrOH; studied at pH 1 to 13.	84A257
		2×10^8	13.3			p.r.	D.k. at 300 nm, in N_2O-satd. soln. contg. 2-PrOH; $2k/\varepsilon = 2.7 \times 10^5$ cm s^{-1}.	690419
16.3	**Disilver monocation**							
	$(CH_3)_2\dot{C}OH + Ag_2^+ \rightarrow CH_3COCH_3 + H^+ + Ag_2$	2.5×10^9				p.r.	Calcd. from increase in condy. as function of time in soln. contg. 0.1 mol L^{-1} 2-PrOH and 5×10^{-4} mol L^{-1} $AgClO_4$.	78A410
16.4	**Silver(I) ion**							
	$(CH_3)_2\dot{C}OH + Ag^+ \rightarrow$					p.r.	No reaction to give Ag^0 in soln. contg. 0.1 mol L^{-1} 2-PrOH.	78A410
16.5	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatoargentate(II) ion**							
	$(CH_3)_2\dot{C}OH + AgTPPS^{4-} \rightarrow AgTPPS^{5-} + CH_3COCH_3 + H^+$	6×10^8	8.9			p.r.	D.k. at 540 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 1.5×10^{-4} mol L^{-1} $Ag^{II}TPPS$.	81A247
16.6	**Bismuth(III) ion**							
	$(CH_3)_2\dot{C}OH + Bi^{3+} \rightarrow BiC(CH_3)_2OH^{3+}$	4×10^5	<0			p.r.	P.b.k. at ~400 nm in Ar-satd. soln. contg. 5 *mol L^{-1} $HClO_4$ and 2-PrOH.*	88A493
16.7	**Hexachlorobismuthate(III) ion**							
	$(CH_3)_2\dot{C}OH + BiCl_6^{3-} \rightarrow CH_3COCH_3 + H^+ + BiCl_6^{4-}$	1.7×10^5	<0			p.r.	P.b.k. at 460 nm in Ar-satd. soln. contg. 0.5 mol L^{-1} HCl, 0.1 mol L^{-1} Bi(III), 5 mol L^{-1} 2-PrOH and 2 mol L^{-1} $HClO_4$.	86A035
16.8	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatobismuth(III) ion**							
	$(CH_3)_2\dot{C}OH + BiTMpyP^{5+} \rightarrow CH_3COCH_3 + H^+ + [BiTMpyP]^{\bullet 4+}$	2.1×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	86A138
16.9	**Cadmium(I) ions**							
	$(CH_3)_2\dot{C}OH + Cd^+ \rightarrow CdC(CH_3)_2OH^+$	2.4×10^9				p.r.	D.k. at 300 nm (Cd^+) in soln. contg. 2-PrOH and Cd^{2+}, as well as condy. and p.b.k. at 240 nm (Cd_2^{2+}); assumed $k(Cd^+ + H_2O_2) = 1.5 \times 10^9$, $k(R + R) = 7 \times 10^8$ and $2k(Cd^+ + Cd^+) = 3.0 \times 10^9$ L mol^{-1} s^{-1}.	751064
16.10	**Cadmium(II) ion**							
	$(CH_3)_2\dot{C}OH + Cd^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in Cd^+ in soln. contg. 0.1 mol L^{-1} Cd^{2+} upon addn. of 0.1 mol L^{-1} 2-PrOH.	751027
		$<2.5 \times 10^5$				p.r.	No reaction obs.	751153

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.11	**Cobalt(II) ion**							
	$(CH_3)_2\dot{C}OH + Co^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in Co^+ in soln. contg. 0.1 mol L^{-1} Co^{2+} upon addn. of 0.1 mol L^{-1} 2-PrOH.	751027
16.12	**Nitrilotriacetatocobaltate(II) ion**							
	$(CH_3)_2\dot{C}OH + CoNTA^- \rightarrow$ $HOC(CH_3)_2CoNTA(H_2O)^-$	2.3×10^7	4-7		298	p.r.	P.b.k. at 260 nm in N_2O-satd. soln. contg. $(1\text{-}50) \times 10^{-4}$ mol L^{-1} CoNTA and 0.2-1 mol L^{-1} 2-PrOH.	88A343
16.13	**2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(II) ion**							
	$(CH_3)_2\dot{C}OH + Co(Me_4tetraeneN_4)^{2+} \rightarrow$ $CH_3COCH_3 + H^+ +$ $Co(Me_4tetraeneN_4)^+$	5.5×10^9	1.25, 6.5			p.r.	P.b.k. in soln. contg. 2 mol L^{-1} 2-PrOH.	761001
16.14	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$(CH_3)_2\dot{C}OH +$ *N-rac*-$Co(4,11\text{-}dieneN_4)^{2+} \rightarrow$	$<10^7$				p.r.	No reaction obs.	78A200
		$\ll 10^7$	6.5			p.r.	No reaction obs. in soln. contg. 2 mol L^{-1} 2-PrOH.	761001
16.15	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)(dihydroxy)cobalt(II)**							
	$(CH_3)_2\dot{C}O^- +$ *N-rac*-$Co(4,11\text{-}dieneN_4)(OH)_2 \rightarrow$ $CH_3COCH_3 +$ *N-rac*-$Co(4,11\text{-}dieneN_4)(OH)_2^-$	3.5×10^8	>11		298	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A513
16.16	**5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,14-dienecobalt(II) ion**							
	$(CH_3)_2\dot{C}OH + Co(4,14\text{-}dieneN_4)^{2+} \rightarrow$	$\ll 10^7$	6.5			p.r.	No reaction obs. in soln. contg. in 2 mol L^{-1} 2-PrOH.	761001
16.17	**2,2′-Bipyridinecobalt(II) ion**							
	$(CH_3)_2\dot{C}OH + Co(bpy)^{2+} \rightarrow$ $Co(bpy)[C(OH)(CH_3)_2]^{2+}$	2.0×10^6			296	p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total k for radical consumption.	85A034
16.18	**4,4′-Dimethyl-2,2′-bipyridinecobalt(II) ion**							
	$(CH_3)_2\dot{C}OH + Co(4,4'\text{-}Me_2bpy)^{2+} \rightarrow$ $Co(4,4'\text{-}Me_2bpy)[C(OH)(CH_3)_2]^{2+}$	1.0×10^6				p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total k for radical consumption.	85A034
16.19	***Bis(2,2′-bipyridine)cobalt(II) ion***							
	$(CH_3)_2\dot{C}OH + Co(bpy)_2^{2+} \rightarrow$ $Co(bpy)_2[C(OH)(CH_3)_2]^{2+}$	2.0×10^6				p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total k for radical consumption.	85A034
16.20	**Bis(4,4′-dimethyl-2,2′-bipyridine)cobalt(II) ion**							
	$(CH_3)_2\dot{C}OH + Co(4,4'\text{-}Me_2bpy)_2^{2+} \rightarrow$ $Co(4,4'\text{-}Me_2bpy)_2[C(OH)(CH_3)_2]^{2+}$	1.0×10^6				p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total k for radical consumption.	85A034
16.21	**Tris(2,2′-bipyridine)cobalt(II) ion**							
	$(CH_3)_2\dot{C}OH + Co(bpy)_3^{2+} \rightarrow Co(bpy)_3^+$ $+ CH_3COCH_3 + H^+$	4.0×10^7				p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total k for radical consumption; 40% addn.	85A034
16.22	**Tris(4,4′-dimethyl-2,2′-bipyridine)cobalt(II) ion**							
	$(CH_3)_2\dot{C}OH + Co(4,4'\text{-}Me_2bpy)_3^{2+} \rightarrow$ $Co(4,4'\text{-}Me_2bpy)_3[C(OH)(CH_3)_2]^{2+}$	5×10^6				p.r.	P.b.k. at 430 nm in Ar-satd. soln. contg. 2-PrOH; total k for radical consumption.	85A034
16.23	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion**							
	$(CH_3)_2\dot{C}OH + CoTPPS^{4-} \rightarrow$ $HO(CH_3)_2CCoTPPS^{4-}$	1.2×10^9	8		294	p.r.	P.b.k. in N_2O-satd. soln. contg. 1.5 mol L^{-1} 2-PrOH.	83A088

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	$T(K)$	Method	Comment	Ref.
16.24	**Hydroxytetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion**							
	$(CH_3)_2\dot{C}O^- + (HO)CoTPPS^{5-} \rightarrow CH_3COCH_3 + (HO)CoTPPS^{6-}$	6.9×10^8	13		294	p.r.	D.k. in soln. contg. 1.5 mol L^{-1} 2-PrOH; follows fast e_{aq}^- reaction.	83A088
16.25	**3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion dimer**							
	$(CH_3)_2\dot{C}OH + [Co(tspc)]_2^{8-} \rightarrow$ electron transfer	1.5×10^9	9			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH; mechanism suggested to involve ligand-radical formation, followed by metal redn. and dimer splitting to give $(Co^{I}tspc)^{5-}$.	80A146
16.26	**Hexaamminecobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_6^{3+} \rightarrow CH_3COCH_3 + Co(NH_3)_6^{2+} + H^+$	4.1×10^5	0-3	0.1	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. 1.5×10^{-4} mol L^{-1} $CrC(CH_3)_2OH^{2+}$, 0.4 mol L^{-1} 2-PrOH, 1.4×10^{-3} mol L^{-1} Cr^{2+} and $(4.5\text{-}64) \times 10^{-3}$ mol L^{-1} H^+; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	82A480
		1.3×10^7	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} 2-PrOH.	72A018
	$(CH_3)_2\dot{C}O^- + Co(NH_3)_6^{3+} \rightarrow CH_3COCH_3 + Co(NH_3)_6^{2+}$	5.0×10^9	12			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} 2-PrOH.	72A018
16.27	**Hexa(ammine-d_3)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(ND_3)_6^{3+} \rightarrow CH_3COCH_3 + Co(ND_3)_6^{2+} + H^+$	3.0×10^5	0-3	0.1	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. 9.0×10^{-5} mol L^{-1} $CrC(CH_3)_2OH^{2+}$, 0.4 mol L^{-1} 2-PrOH, $[Co(ND_3)_6^{3+}]/[Cr^{2+}] = 0.214\text{-}0.531$ and $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$; in D_2O $k((CH_3)_2\dot{C}OD + Co(ND_3)_6^{3+}) = 2.4 \times 10^5$ L mol^{-1} s^{-1}.	82A480
16.28	**Pentaammine(bromo)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5Br^{2+} \rightarrow$	3.0×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	771100
16.29	**Pentaammine(chloro)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5Cl^{2+} \rightarrow$	4.0×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	771100
16.30	**Pentaammine(fluoro)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5F^{2+} \rightarrow$	2.2×10^6	~1	1.0	298	chem.	C.k., radical from homolysis of $CrC(CH_3)_2OH^{2+}$; rel. to $k((CH_3)_2\dot{C}OH + Co(en)_3^{3+}) = 1.7 \times 10^5$ L mol^{-1} s^{-1}.	83A048
16.31	**Pentaammine(2-nitrobenzoato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5O_2CC_6H_4\text{-}2\text{-}NO_2^{2+} \rightarrow CH_3COCH_3 + H^+ + [Co(NH_3)_5O_2CC_6H_4\text{-}2\text{-}NO_2]^{\cdot+}$	2.0×10^9	7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
		1.7×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	771027
16.32	**Pentaammine(3-nitrobenzoato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5O_2CC_6H_4\text{-}3\text{-}NO_2^{2+} \rightarrow CH_3COCH_3 + H^+ + [Co(NH_3)_5O_2CC_6H_4\text{-}3\text{-}NO_2]^{\cdot+}$	2.5×10^9	7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
		1.5×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	771027

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.33	**Pentaammine(4-nitrobenzoato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CC_6H_4\text{-}4\text{-}NO_2^{2+}$ → $CH_3COCH_3 + H^+$ + $[Co(NH_3)_5O_2CC_6H_4\text{-}4\text{-}NO_2]^{\cdot+}$	$\sim 4 \times 10^9$	7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-3}$ mol L^{-1} complex.	86A340
		2.6×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	771027
		2.6×10^9	4.5			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	741002
16.34	**Pentaammine(2,4-dinitrobenzoato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CC_6H_3\text{-}2,4\text{-}(NO_2)_2^{2+}$ →	4.3×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	771027
16.35	**Pentaammine(3,5-dinitrobenzoato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CC_6H_3\text{-}3,5\text{-}(NO_2)_2^{2+}$ →	2.9×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	771027
16.36	**Hexaamminebis(μ-hydroxy)[μ-(4-nitrobenzoato)]dicobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $HO[Co(NH_3)_3]_2O_2CC_6H_4\text{-}4\text{-}NO_2^{3+}$ → $CH_3COCH_3 + H^+$ + $HO[Co(NH_3)_3]_2O_2CC_6H_4\text{-}4\text{-}\dot{N}O_2^{2+}$	1.4×10^9			295	p.r.	P.b.k. at 370 nm in soln. contg. 1% 2-PrOH; $\Delta H‡ = 13 \pm 8$ kJ mol^{-1} studied at 273-306 K; $k = 1.3 \times 10^9$ and 4.3×10^8 L $mol^{-1}\ s^{-1}$ and $\Delta H‡ = 13$ and 39 kJ mol^{-1} in 10% and 90% 2-PrOH, resp.; $k = 1.25 \times 10^9$ L $mol^{-1}\ s^{-1}$ in 99% D_2O-1% 2-PrOH.	80A066
		2×10^9	0.7-6.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	78A108
16.37	**Pentaammine(2-nitrophenylacetato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CCH_2C_6H_4\text{-}2\text{-}NO_2^{2+}$ → $CH_3COCH_3 + H^+$ + $[Co(NH_3)_5O_2CCH_2C_6H_4\text{-}2\text{-}NO_2]^{\cdot+}$	1.3×10^9 2.6×10^9	0-1 7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.38	**Pentaammine(3-nitrophenylacetato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CCH_2C_6H_4\text{-}3\text{-}NO_2^{2+}$ → $CH_3COCH_3 + H^+$ + $[Co(NH_3)_5O_2CCH_2C_6H_4\text{-}3\text{-}NO_2]^{\cdot+}$	2.3×10^9 1.9×10^9	0-1 7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.39	**Pentaammine(4-nitrophenylacetato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CCH_2C_6H_4\text{-}4\text{-}NO_2^{2+}$ → $CH_3COCH_3 + H^+$ + $[Co(NH_3)_5O_2CCH_2C_6H_4\text{-}4\text{-}NO_2]^{\cdot+}$	1.7×10^9	0-1, 7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.40	**Pentaammine(2,4-dinitrophenylacetato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CCH_2C_6H_3\text{-}2,4\text{-}(NO_2)_2^{2+}$ → $CH_3COCH_3 + H^+$ + $[Co(NH_3)_5O_2CCH_2C_6H_3\text{-}2,4\text{-}(NO_2)_2]^{\cdot+}$	2.5×10^9	0-1		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.41	**Pentaammine(4-nitrophenylbutanoato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2C(CH_2)_3C_6H_4\text{-}4\text{-}NO_2^{2+}$ → $CH_3COCH_3 + H^+$ + $[Co(NH_3)_5O_2C(CH_2)_3C_6H_4\text{-}4\text{-}NO_2]^{\cdot+2}$	2.2×10^9	7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.42	**Pentaammine(4-nitrophenylglycinato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5(4\text{-}NO_2C_6H_4Gly)^{2+}$ → $CH_3COCH_3 + H^+$ + $Co(NH_3)_5(4\text{-}\dot{N}O_2C_6H_4Gly)^+$	3.5×10^9	7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.43	**Pentaammine(2-nitrocinnamato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}2\text{-}NO_2^{2+}$ → $CH_3COCH_3 + H^+$ + $[Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}2\text{-}NO_2]^{\cdot+}$	1.5×10^9 2.0×10^9	0-1 7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.44	**Pentaammine(4-nitrophenylglycylglycinato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5(4\text{-}NO_2C_6H_4GlyGly)^{2+}$ → $CH_3COCH_3 + H^+$ + $Co(NH_3)_5(4\text{-}NO_2C_6H_4GlyGly)^+$	2.6×10^9 2.8×10^9	0-1 7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.45	**Pentaammine(3-nitrocinnamato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}3\text{-}NO_2^{2+}$ → $CH_3COCH_3 + H^+$ + $[Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}3\text{-}NO_2]^{\cdot+}$	3.0×10^9 2.0×10^9	0-1 7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.46	**Pentaammine(4-nitrocinnamato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}4\text{-}NO_2^{2+}$ → $CH_3COCH_3 + H^+$ + $[Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}4\text{-}NO_2]^{\cdot+}$	2.6×10^9 3.9×10^9	0-1 7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.47	**Pentaammine(4-nitrophenylsulfonato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $4\text{-}O_2NC_6H_4SO_3Co(NH_3)_5^{2+}$ → $CH_3COCH_3 + H^+$ + $4\text{-}O_2NC_6H_4OSO_2Co(NH_3)_5^+$	1.8×10^9	7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.48	**Pentaammine(4-nitrophenylcyano)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $4\text{-}O_2NC_6H_4CNCo(NH_3)_5^{3+}$ → $CH_3COCH_3 + H^+$ + $4\text{-}O_2NC_6H_4CNCo(NH_3)_5^{2+}$	2.8×10^9	7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.49	**Pentaammine(4-nitrophenylaminosulfonyl)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $p\text{-}O_2NC_6H_4NHSO_2Co(NH_3)_5^{2+}$ → $CH_3COCH_3 + H^+$ + $4\text{-}O_2NC_6H_4NHSO_2Co(NH_3)_5^+$	2.7×10^9	7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.50	**Pentaammine(4-nitrophenoxido)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $4\text{-}O_2NC_6H_4OCo(NH_3)_5^{2+}$ → $CH_3COCH_3 + H^+$ + $4\text{-}O_2NC_6H_4OCo(NH_3)_5^+$	2.9×10^9	7		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.51	**Pentaammine(imidazole)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(Im)^{3+}$ → $CH_3COCH_3 + H^+ + Co(NH_3)_5(Im)^{2+}$	1.4×10^6	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+, Cr^{2+}, Co(III) complex and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.52	**Pentaammine(4,5-dichloroimidazole)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(4,5\text{-}Cl_2Im)^{3+}$ → $CH_3COCH_3 + H^+$ + $Co(NH_3)_5(4,5\text{-}Cl_2Im)^{2+}$	1.9×10^7	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+, Cr^{2+}, Co(III) complex and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.53	**Pentaammine(1-methylimidazole)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(1\text{-MeIm})^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(NH_3)_5(1\text{-MeIm})^{2+}$	2.2×10^6	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+, Cr^{2+}, Co(III) complex and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.54	**Pentaammine(2-methylimidazole)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(2\text{-MeIm})^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(NH_3)_5(2\text{-MeIm})^{2+}$	3.0×10^6	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+, Cr^{2+}, Co(III) complex and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.55	**Pentaammine(4-methylimidazole)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(4\text{-MeIm})^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(NH_3)_5(4\text{-MeIm})^{2+}$	1.8×10^6	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+, Cr^{2+}, Co(III) complex and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.56	**Pentaammine(pyridine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(py)^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(NH_3)_5(py)^{2+}$	1.2×10^7	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. $CrC(CH_3)_2OH^{2+}$, $(2.0\text{-}12.3) \times 10^{-4}$ mol L^{-1} Cr^{2+}, $(14.7\text{-}1.41) \times 10^{-4}$ mol L^{-1} $Co(NH_3)_5(py)^{3+}$, 1.0 mol L^{-1} 2-PrOH, 0.1 mol L^{-1} $HClO_4$ and $LiClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A289
		$\sim 10^9$	1-7			γ-r.	Estd. from $G(Co^{2+})$ in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	79A213
16.57	**Pentaammine(4-methylpyridine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(4\text{-}CH_3py)^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(NH_3)_5(4\text{-}CH_3py)^{2+}$	9.3×10^6	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. $CrC(CH_3)_2OH^{2+}$, $(2.87\text{-}4.73) \times 10^{-4}$ mol L^{-1} Cr^{2+}, $(2.4\text{-}7.0) \times 10^{-4}$ mol L^{-1} $Co(NH_3)_5(4\text{-}CH_3py)^{3+}$, 1.0 mol L^{-1} 2-PrOH, 0.1 mol L^{-1} $HClO_4$ and $LiClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A289
16.58	**Pentaammine(4-*tert*-butylpyridine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(4\text{-}C(CH_3)_3py)^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(NH_3)_5(4\text{-}C(CH_3)_3py)^{2+}$	8.7×10^6	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. $CrC(CH_3)_2OH^{2+}$, $(2.29\text{-}6.48) \times 10^{-4}$ mol L^{-1} Cr^{2+}, $(2.3\text{-}6.6) \times 10^{-4}$ mol L^{-1} $Co(NH_3)_5(4\text{-}C(CH_3)_3py)^{3+}$, 1.0 mol L^{-1} 2-PrOH, 0.1 mol L^{-1} $HClO_4$ and $LiClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A289

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.59	**Pentaammine[4-(dimethylamino)pyridine]cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(4\text{-}NMe_2py)^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(NH_3)_5(4\text{-}NMe_2py)^{2+}$	3.4×10^6	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. $CrC(CH_3)_2OH^{2+}$, $(1.23\text{-}4.39) \times 10^{-4}$ mol L^{-1} Cr^{2+}, $(2.5\text{-}6.3) \times 10^{-4}$ mol L^{-1} $Co(NH_3)_5(4\text{-}NMe_2py)^{3+}$, 1.0 mol L^{-1} 2-PrOH, 0.1 mol L^{-1} $HClO_4$ and $LiClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A289
16.60	**Pentaammine(3-chloropyridine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(3\text{-}Clpy)^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(NH_3)_5(3\text{-}Clpy)^{2+}$	3.1×10^7	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. $CrC(CH_3)_2OH^{2+}$, $(2.57\text{-}6.0) \times 10^{-4}$ mol L^{-1} Cr^{2+}, $(1.46\text{-}8.50) \times 10^{-4}$ mol L^{-1} $Co(NH_3)_5(3\text{-}Clpy)^{3+}$, 1.0 mol L^{-1} 2-PrOH, 0.1 mol L^{-1} $HClO_4$ and $LiClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A289
16.61	**Pentaammine(3-cyanopyridine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(3\text{-}CNpy)^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(NH_3)_5(3\text{-}CNpy)^{2+}$	1.4×10^8	1	1.0	298	chem.	D.k. at 300-330 nm in soln. contg. $CrC(CH_3)_2OH^{2+}$, $(3.49\text{-}6.21) \times 10^{-4}$ mol L^{-1} Cr^{2+}, $(1.75\text{-}9.96) \times 10^{-4}$ mol L^{-1} $Co(NH_3)_5(3\text{-}CNpy)^{3+}$, 1.0 mol L^{-1} 2-PrOH, 0.1 mol L^{-1} $HClO_4$ and $LiClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A289
16.62	**Pentaammine(carboxymethyl 4-pyridinecarboxylato)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(4\text{-}pyCO_2CH_2CO_2)^{2+} \rightarrow CH_3COCH_3 + H^+ + [Co(NH_3)_5(4\text{-}pyCO_2CH_2CO_2)]^{\cdot+}$	3.0×10^9 2.9×10^9	1 4.5-5.5		295	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	83B029
16.63	**Pentaammine[4-(aminocarbonyl)-1-(carboxymethyl)pyridinio]cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(O_2CCH_2py\text{-}4\text{-}CONH_2)^{3+} \rightarrow CH_3COCH_3 + H^+ + [Co(NH_3)_5(O_2CCH_2py\text{-}4\text{-}CONH_2)]^{\cdot2+}$	4.2×10^9 1.6×10^{10}	1 4.5-5.5		295	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	83B029
16.64	**Pentaammine[4-(aminocarbonyl)-1-(1-carboxyethyl)pyridinio]cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(O_2CCH(CH_3)py\text{-}4\text{-}CONH_2)^{3+} \rightarrow CH_3COCH_3 + H^+ + [Co(NH_3)_5(O_2CCH(CH_3)py\text{-}4\text{-}CONH_2)]^{\cdot2+}$	4.5×10^9 $\leq 2.8 \times 10^8$	1 4.5-5.5		295	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	83B029
16.65	**Pentaammine[4-(aminocarbonyl)-1-(3-carboxypropyl)pyridinio]cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5(O_2C(CH_2)_3py\text{-}4\text{-}CONH_2)^{3+} \rightarrow CH_3COCH_3 + H^+ + [Co(NH_3)_5(O_2C(CH_2)_3py\text{-}4\text{-}CONH_2)]^{\cdot2+}$	4.0×10^9 2.8×10^9	1 4.5-5.5		295	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	83B029
16.66	**Pentaammine(pyrazinecarboxylato-*O*)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_5O_2CC_4H_3N_2^{2+} \rightarrow CH_3COCH_3 + H^+ + [Co(NH_3)_5O_2CC_4H_3N_2(H)]^{\cdot2+}$	4.0×10^8	0-5			p.r.	P.b.k. in N_2O or Ar-satd. soln. contg. 1 mol L^{-1} 2-PrOH; pyrazinyl radical formed.	78A222
16.67	**Tetraammine(pyrazinecarboxylato-*N,O*)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(NH_3)_4O_2CC_4H_3N_2^{2+} \rightarrow$	9×10^8 4.5×10^8	5.1 0.7			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH and $(1\text{-}4) \times 10^{-4}$ mol L^{-1} complex.	82A146

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.68	**Bis(ethylenediamine)pyrazinecarboxylatocobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(en)_2O_2Cpz^{2+} \rightarrow$	3×10^9	5.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(0.5\text{-}5) \times 10^{-4}$ mol L^{-1} complex.	82A146
16.69	**μ-4-Pyrimidinecarboxylatobis[hydroxotris(ammine)cobalt(III)] ion**							
	$(CH_3)_2\dot{C}OH +$ 4-$pmCO_2[Co(NH_3)_3]_2(OH)_2^{3+} \rightarrow$	3.6×10^8	0.7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH and $(1\text{-}5) \times 10^{-4}$ mol L^{-1} complex; no reaction obs. at pH 5.	82A146
16.70	**μ-5-Pyrimidinecarboxylatobis[hydroxotris(ammine)cobalt(III)] ion**							
	$(CH_3)_2\dot{C}OH +$ 5-$pmCO_2[Co(NH_3)_3]_2(OH)_2^{3+} \rightarrow$	1.3×10^8	0.7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH and $(1\text{-}5) \times 10^{-4}$ mol L^{-1} complex.	82A146
16.71	**Tris(ethylenediamine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(en)_3^{3+} \rightarrow$ $CH_3COCH_3 + Co(en)_3^{2+} + H^+$	1.7×10^5	0-3	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $(3.0\text{-}9.0) \times 10^{-4}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$, 0.4 mol L^{-1} 2-PrOH, $(1.95\text{-}3.3) \times 10^{-2}$ mol L^{-1} $Co(en)_3^{3+}$, $(1.90\text{-}5.77) \times 10^{-3}$ mol L^{-1} Cr^{2+} and 3.94×10^{-2}-0.32 mol L^{-1} H^+; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	82A480
			3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH; no reaction detected.	771100
16.72	***trans*-Dibromobis(ethylenediamine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(en)_2Br_2^+ \rightarrow$	6.8×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	771100
16.73	***cis*-Bromobis(ethylenediamine)fluorocobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(en)_2BrF^+ \rightarrow$	1.1×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	771100
16.74	***trans*-Dichlorobis(ethylenediamine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH +$ *trans*-$Co(en)_2Cl_2^+ \rightarrow$	3.8×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	771100
16.75	***cis*-Dichlorobis(ethylenediamine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH +$ *cis*-$Co(en)_2Cl_2^+ \rightarrow$	1.0×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	771100
16.76	**Bis(ethylenediamine)difluorocobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(en)_2F_2^+ \rightarrow$		3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH; no reaction detected.	771100
16.77	***cis*-Aquachlorobis(ethylenediamine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH +$ *cis*-$Co(en)_2(H_2O)Cl^{2+} \rightarrow$	8.2×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	771100
16.78	***cis*-Amminechlorobis(ethylenediamine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH +$ *cis*-$Co(en)_2(NH_3)Cl^{2+} \rightarrow$	2.2×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH.	771100
16.79	**Bis(1,4-diaminobutane)ethylenediaminecobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(en)(tn)_2^{3+} \rightarrow$ $CH_3COCH_3 + H^+ + Co(en)(tn)_2^{2+}$	1.3×10^6	acid	1.0	298	chem.	D.k. at 407 nm in N_2-satd. soln. contg. $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $CrCH(CH_3)_2OH^{2+}$, 0.3-0.4 mol L^{-1} 2-PrOH, 0.03-0.35 mol L^{-1} H^+ and $NaClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A531
16.80	**Bis(ethylenediamine)(1,3-diaminopropane)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(en)_2(tn)^{3+} \rightarrow$ $CH_3COCH_3 + H^+ + Co(en)_2(tn)^{2+}$	5.0×10^5	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $CrCH(CH_3)_2OH^{2+}$, 0.3-0.4 mol L^{-1} 2-PrOH, 0.03-0.35 mol L^{-1} H^+ and $NaClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A531

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.81	**Bis(ethylenediamine)(1,4-diaminobutane)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(en)_2(tmd)^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(en)_2(tmd)^{2+}$	1.0×10^6	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $CrCH(CH_3)_2OH^{2+}$, 0.3-0.4 mol L^{-1} 2-PrOH, 0.03-0.35 mol L^{-1} H^+ and $NaClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol ^{1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A531
16.82	**Tris(1,3-diaminopropane)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(tn)_3^{3+} \rightarrow CH_3COCH_3 + Co(tn)_3^{2+} + H^+$	1.8×10^6	0-3	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. 3.0×10^{-4} mol L^{-1} $CrC(CH_3)_2OH^{2+}$, 0.347 mol L^{-1} 2-PrOH, 4.4×10^{-3} mol L^{-1} Cr^{2+}, $(5.0\text{-}22) \times 10^{-3}$ mol L^{-1} $Co(tn)_3^{3+}$ and $(1.68\text{-}19) \times 10^{-2}$ mol L^{-1} H^+; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	82A480
16.83	**Tris(1,4-diaminobutane)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(tmd)_3^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(tmd)_3^{2+}$	4.3×10^6	acid	0.2	298	chem.	D.k. *in* N_2-satd. soln. contg. $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $CrCH(CH_3)_2OH^{2+}$, 0.3-0.4 mol L^{-1} 2-PrOH, 0.03-0.35 mol L^{-1} H^+ and $NaClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A531
16.84	**Tris-*trans*-(1,2-cyclohexanediamine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(chxn)_3^{3+} \rightarrow CH_3COCH_3 + Co(chxn)_3^{2+} + H^+$	$<1 \times 10^4$	0-3	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.4 mol L^{-1} 2-PrOH, $[Co(chxn)_3^{3+}]/[Cr^{2+}] < 13$ and HCl; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	82A480
16.85	**1,3,6,8,10,13,16,19-Octaazabicyclo[6.6.6]eicosanecobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(sep)^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(sep)^{2+}$	4.6×10^6	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $(1\text{-}5) \times 10^{-4}$ mol L^{-1} $CrCH(CH_3)_2OH^{2+}$, 0.3-0.4 mol L^{-1} 2-PrOH, 0.03-0.35 mol L^{-1} H^+ and $NaClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A531
16.86	**Dihydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(Me_4tetraeneN_4)(OH)_2^+ \rightarrow CH_3COCH_3 + H^+ + Co(Me_4tetraeneN_4)(OH)_2$	3.3×10^8	9.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	761203
16.87	**(Aqua)hydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(Me_4tetraeneN_4)(H_2O)OH^{2+} \rightarrow CH_3COCH_3 + H^+ + Co(Me_4tetraeneN_4)(H_2O)OH^+$	5.5×10^8	5.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	761203
16.88	**2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(Me_4tetraeneN_4)^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(Me_4tetraeneN_4)(H_2O)_2^{2+}$	1.9×10^9	1.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	761203
16.89	**Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(4,11\text{-dieneN}_4)Cl_2^+ \rightarrow CH_3COCH_3 + H^+ + Co(4,11\text{-dieneN}_4)Cl_2$	7.0×10^8	1.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	761203

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.90	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienedihydroxycobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(4,11\text{-dieneN}_4)(OH)_2^+ \rightarrow CH_3COCH_3 + H^+ +$ *N-rac*-$Co(4,11\text{-dieneN}_4)(OH)_2$	1.1×10^8	10.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	761203
16.91	**Aqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)hydroxycobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(4,11\text{-dieneN}_4)(H_2O)OH^{2+} \rightarrow CH_3COCH_3 + H^+ + Co(4,11\text{-dieneN}_4)(H_2O)OH^+$	1.1×10^8	6.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	761203
16.92	**Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + Co(4,11\text{-dieneN}_4)(H_2O)_2^{3+} \rightarrow CH_3COCH_3 + H^+ + Co(4,11\text{-dieneN}_4)(H_2O)_2^{2+}$	2.0×10^8	2.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	761203
16.93	**3-((4-Nitrophenyl)carbonyl)-2,4-dimethyl-1,5,8,12-tetraazacyclotetradeca-1,3-dienecobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + NCYC → redn.	2.0×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} complex.	86A340
16.94	**μ-*p*-Nitrobenzoatobis[hydroxo(1,4,7-triazacyclononane)cobalt(III)] ion**							
	$(CH_3)_2\dot{C}OH + NO_2C_6H_4CO_2[Co_2(\mu\text{-}OH)_2(tacn)_2]^{3+} \rightarrow$	1×10^9 7×10^8	1 5			p.r.	P.b.k. in Ar-satd. soln. contg. 1 mol L^{-1} 2-PrOH and $(1\text{-}5) \times 10^{-4}$ mol L^{-1} complex.	82A146
16.95	**μ-(Pyrazinecarboxylato)bis[hydroxo(1,4,7-triazacyclononane)cobalt(III)] ion**							
	$(CH_3)_2\dot{C}OH + C_4H_3N_2CO_2[Co_2(\mu\text{-}OH)_2(tacn)_2]^{3+} \rightarrow$	2.2×10^9 3.5×10^8	1 5			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH and $(1\text{-}5) \times 10^{-4}$ mol L^{-1} complex.	82A146
16.96	**Aquabis(dimethylglyoximato)methylcobalt(III)**							
	$(CH_3)_2\dot{C}OH + CH_3Co(dmgH)_2(H_2O) \rightarrow$ *tert*-$BuOH + Co(dmgH)_2(H_2O)_2$	7×10^5	acid	1.0	298	chem.	C.k. in soln. contg. $CrCH_2C_6H_5^{2+}$, H_2O_2 and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + Co(en)_3^{3+}) = 1.7 \times 10^5$ $L\ mol^{-1}\ s^{-1}$.	86M354
16.97	**Aquabis[dimethylglyoximato]methylcobalt(III), protonated**							
	$(CH_3)_2\dot{C}OH + CH_3Co(dmg_2H_3)(H_2O)^+ \rightarrow$ *tert*-$BuOH + Co(dmg_2H_3)(H_2O)_2^+$	1×10^6	acid	1.0	298	chem.	C.k. in soln. contg. $CrCH_2C_6H_5^{2+}$, H_2O_2 and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + Co(en)_3^{3+}) = 1.7 \times 10^5$ $L\ mol^{-1}\ s^{-1}$.	86M354
16.98	**Aquabis(dimethylglyoximato)ethylcobalt(III)**							
	$(CH_3)_2\dot{C}OH + CH_3CH_2Co(dmgH)_2(H_2O) \rightarrow C_2H_5C(CH_3)_2OH + Co(dmgH)_2(H_2O)_2$	6×10^5	acid	1.0	298	chem.	C.k. in soln. contg. $CrCH_2C_6H_5^{2+}$, H_2O_2 and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + Co(en)_3^{3+}) = 1.7 \times 10^5$ $L\ mol^{-1}\ s^{-1}$.	86M354
16.99	**Aquabis[dimethylglyoximato]ethylcobalt(III), protonated**							
	$(CH_3)_2\dot{C}OH + CH_3CH_2Co(dmg_2H_3)(H_2O)^+ \rightarrow C_2H_5C(CH_3)_2OH + Co(dmg_2H_3)(H_2O)_2^+$	8×10^5	acid	1.0	298	chem.	C.k. in soln. contg. $CrCH_2C_6H_5^{2+}$, H_2O_2 and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + Co(en)_3^{3+}) = 1.7 \times 10^5$ $L\ mol^{-1}\ s^{-1}$.	86M354
16.100	**Aquabis(dimethylglyoximato)(1-methylethyl)cobalt(III)**							
	$(CH_3)_2\dot{C}OH + (CH_3)_2CHCo(dmgH)_2(H_2O) \rightarrow (CH_3)_2CHC(CH_3)_2OH + Co(dmgH)_2(H_2O)_2$	4×10^5	acid	1.0	298	chem.	C.k. in soln. contg. $CrCH_2C_6H_5^{2+}$, H_2O_2 and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + Co(en)_3^{3+}) = 1.7 \times 10^5$ $L\ mol^{-1}\ s^{-1}$.	86M354
16.101	**Aquabis[dimethylglyoximato)](1-methylethyl)cobalt(III), protonated**							
	$(CH_3)_2\dot{C}OH + (CH_3)_2CHCo(dmg_2H_3)(H_2O)^+ \rightarrow (CH_3)_2CHC(CH_3)_2OH + Co(dmg_2H_3)(H_2O)_2^+$	5×10^5	acid	1.0	298	chem.	C.k. in soln. contg. $CrCH_2C_6H_5^{2+}$, H_2O_2 and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + Co(en)_3^{3+}) = 1.7 \times 10^5$ $L\ mol^{-1}\ s^{-1}$.	86M354

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.102	**Aqua(benzyl)bis(dimethylglyoximato)cobalt(III)**							
	$(CH_3)_2\dot{C}OH$ + $C_6H_5CH_2Co(dmgH)_2(H_2O)$ → $C_6H_5CH_2C(OH)(CH_3)_2$ + $Co(dmgH)_2(H_2O)_2$	5×10^6	acid	1.0	298	chem.	C.k. in soln. contg. $CrCH_2C_6H_5^{2+}$, H_2O_2 and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + Co(en)_3^{3+}) = 1.7\times10^5\ L\ mol^{-1}\ s^{-1}$.	86M354
16.103	**Aqua(benzyl)bis(dimethylglyoximato)cobalt(III), protonated**							
	$(CH_3)_2\dot{C}OH$ + $C_6H_5CH_2Co(dmg_2H_3)(H_2O)^+$ → $C_6H_5CH_2C(OH)(CH_3)_2$ + $Co(dmg_2H_3)(H_2O)_2^+$	1.0×10^7	acid	1.0	298	chem.	C.k. in soln. contg. $CrCH_2C_6H_5^{2+}$, H_2O_2 and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + Co(en)_3^{3+}) = 1.7\times10^5\ L\ mol^{-1}\ s^{-1}$.	86M354
16.104	**Benzylbis(dimethylglyoximato)(pyridine)cobalt(III)**							
	$(CH_3)_2\dot{C}O^-$ + $C_6H_5CH_2Co(dmgH)_2(py)$ → CH_3COCH_3 + $C_6H_5CH_2Co(dmgH)_2(py)^-$	8×10^8	12			p.r.	P.b.k. at 700 nm in deoxygenated soln. contg. 10% 2-PrOH.	94A288
16.105	**Aquabromobis(dimethylglyoximato)cobalt(III)**							
	$(CH_3)_2\dot{C}OH$ + $BrCo(dmgH)_2(H_2O)$ → $CH_3COCH_3 + H^+ + Br^-$ + $Co(dmgH)_2(H_2O)_2$	1.5×10^8	7.5		296	f.p./rq	P.b.k. at 462 nm in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	86A074
16.106	**Aquachlorobis(dimethylglyoximato)cobalt(III)**							
	$(CH_3)_2\dot{C}OH$ + $ClCo(dmgH)_2(H_2O)$ → $CH_3COCH_3 + H^+ + Cl^-$ + $Co(dmgH)_2(H_2O)_2$	8.9×10^7	7.5		296	f.p./rq	P.b.k. at 462 nm in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	86A074
16.107	**Dihydroxytetrakis(4-sulfonatophenyl)porphinatocobaltate(III) ion**							
	$(CH_3)_2\dot{C}O^-$ + $CoTPPS(OH)_2^{5-}$ → $CH_3COCH_3 + H^+ + CoTPPS(OH)_2^{6-}$	1.1×10^9	13			p.r.	P.b.k. (Co^{II}) and d.k. (Co^{III}) in N_2O-satd. soln. contg. 2-PrOH.	81A317
16.108	**(Aqua)hydroxytetrakis(4-sulfonatophenyl)porphinatocobaltate(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $CoTPPS(H_2O)(OH)^{4-}$ → $CoTPPS(H_2O)(OH)^{5-} + CH_3COCH_3$	8×10^8	8			p.r.	P.b.k. (Co^{II}) and d.k. (Co^{III}) in N_2O-satd. soln. contg. 2-PrOH.	81A317
16.109	**Dihydroxytetrakis(1-methylpyridinium-4-yl)porphinecobalt(III) ion**							
	$(CH_3)_2\dot{C}O^-$ + $CoTMpyP(OH)_2^{3+}$ → $CoTMpyP(OH)_2^{2+} + CH_3COCH_3$	7.0×10^9	13			p.r.	P.b.k. (Co^{II}) and d.k. (Co^{III}) in N_2O-satd. soln. contg. 2-PrOH.	81A317
16.110	**(Aqua)hydroxytetrakis(1-methylpyridinium-4-yl)porphinecobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $CoTMpyP(H_2O)(OH)^{4+}$ → $CoTMpyP(H_2O)(OH)^{3+}$ + CH_3COCH_3	1.8×10^9	8			p.r.	P.b.k. (Co^{II}) and d.k. (Co^{III}) in N_2O-satd. soln. contg. 2-PrOH.	81A317
16.111	**Dihydroxytetrakis[4-(*N,N,N*-trimethylammonio)phenyl]porphinecobalt(III) ion**							
	$(CH_3)_2\dot{C}O^-$ + $CoTAPP(OH)_2^{3+}$ → $CoTAPP(OH)_2^{2+} + CH_3COCH_3$	3.4×10^9	13			p.r.	P.b.k. (Co^{II}) and d.k. (Co^{III}) in N_2O-satd. soln. contg. 2-PrOH.	81A317
16.112	**Tris(2,2′-bipyridine)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(bpy)_3^{3+}$ → $CH_3COCH_3 + H^+ + Co(bpy)_3^{2+}$	2.5×10^9	0.5, 7.8			p.r.	P.b.k. at 330 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	79A034
16.113	**Tris(1,10-phenanthroline)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(phen)_3^{3+}$ → $CH_3COCH_3 + H^+ + Co(phen)_3^{2+}$	4.6×10^9	7.0			p.r.	P.b.k. at 360 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	79A034
16.114	**Tris(5,6-dimethyl-1,10-phenanthroline)cobalt(III) ion**							
	$(CH_3)_2\dot{C}OH$ + $Co(5,6\text{-}Me_2phen)_3^{3+}$ → $CH_3COCH_3 + H^+$ + $Co(5,6\text{-}Me_2phen)_3^{2+}$	3.2×10^9	~7			p.r.	P.b.k., as well as d.k. at 380 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} 2-PrOH; same product from e_{aq}^- reaction.	80A227

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.115	**Decakis(cyano)-μ-superoxidodicobaltate(III) ion**							
	$(CH_3)_2\dot{C}OH + O_2[Co(CN)_5]_2^{5-} \rightarrow CH_3COCH_3 + H^+ + O_2[Co(CN)_5]_2^{6-}$	2.6×10^8	~5.0			p.r.	D.k.; redn. may involve metal in part.	81A009
16.116	**μ-Amido-μ-superoxidotetrakis(ethylenediamine)dicobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + NH_2[Co(en)_2]_2(O_2)^{4+} \rightarrow CH_3COCH_3 + H^+ + NH_2[Co(en)_2]_2(O_2)^{3+}$	1.3×10^9	~5.0			p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	81A009
16.117	***μ*-Amido-*μ*-superoxidooctakisamminedicobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + NH_2[Co(NH_3)_4]_2(O_2)^{4+} \rightarrow CH_3COCH_3 + H^+ + NH_2[Co(NH_3)_4]_2(O_2)^{3+}$	1.5×10^9	~5.0			p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	81A009
16.118	**μ-Pyrazinecarboxylatobis[hydroxytris(ammine)cobalt(III)] ion**							
	$(CH_3)_2\dot{C}OH + pzCO_2[Co(NH_3)_3]_2(OH)_2^{3+} \rightarrow CH_3COCH_3 + H^+ + [pzCO_2[Co(NH_3)_3]_2(OH)_2]^{+2+}$	4.2×10^8	0-5			p.r.	P.b.k. in N_2O or Ar-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	78A222
16.119	**Pentaammineosmium(III)(isonicotinylprolylprolylprolinato)pentaamminecobalt(III) ion**							
	$(CH_3)_2\dot{C}OH + [(NH_3)_5Os^{III}iso(Pro)_3Co^{III}(NH_3)_5]^{5+} \rightarrow CH_3COCH_3 + H^+ + [(NH_3)_5Os^{II}iso(Pro)_3Co^{III}(NH_3)_5]^{4+}$	6×10^8			298	p.r.	P.b.k. at 525 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH.	85A396
16.120	**Chromium(II) ion**							
	$(CH_3)_2\dot{C}OH + Cr^{2+} \rightarrow CrC(CH_3)_2OH^{2+}$	6.4×10^7	~3		293	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and 2-PrOH; $\Delta V^{\ddagger} = 5.7$ cm^3 mol^{-1} studied at 0.1-150 MPa.	92A361
		6.4×10^7	4.1			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.9 mol L^{-1} 2-PrOH and 0.001 mol L^{-1} Cr^{2+}; k dependent on acetate concn. $\Delta V^{\ddagger} = 5.7$ cm^3 mol^{-1} studied at 0.1-150 MPa [93A323].	92A484
		5×10^7	0-6.2			p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. 0.01-2 mol L^{-1} 2-PrOH, (1-15) $\times 10^{-4}$ mol L^{-1} Cr^{2+} and (9-100) $\times 10^{-4}$ AcO^-/AcOH.	84A036
		5.1×10^7	~1			p.r.	P.b.k. in Ar-satd. soln. contg. 2-PrOH and $HClO_4$.	741146
16.121	**Acetatochromium(II) ion**							
	$(CH_3)_2\dot{C}OH + Cr(OAc)^+ \rightarrow (CH_3)_2C(OH)Cr(OAc)^+$	2.0×10^7	5.2			p.r.	P.b.k.in N_2O-satd. soln. contg. 0.9 mol L^{-1} 2-PrOH, 0.001 mol L^{-1} Cr^{2+} and 0.27 mol L^{-1} acetate ion; $\Delta V^{\ddagger} = -7.4$ cm^3 mol^{-1} studied at 0.1-150 MPa [93A323].	92A484
16.122	***trans*-Diaqua(1,4,8,12-tetraazacyclopentadecane)chromium(II) ion**							
	$(CH_3)_2\dot{C}OH + Cr([15]aneN_4)^{2+} \rightarrow (CH_3)_2C(OH)Cr([15]aneN_4)^{2+}$	4.9×10^7	4.4-5.3			p.r.	P.b.k. at 320 nm in N_2O-satd. soln. contg. (0.2-11.0) $\times 10^{-3}$ mol L^{-1} [15]aneN$_4$, (0.16-1.0) $\times 10^{-3}$ mol L^{-1} Cr^{2+}, (0-0.009) mol L^{-1} acetate and 1.0 mol L^{-1} 2-PrOH.	85A499
16.123	***cis*-Diaqua(nitrilotriacetato)chromate(II) ion**							
	$(CH_3)_2\dot{C}OH + cis\text{-}[CrNTA(H_2O)_2]^- \rightarrow cis\text{-}[(CH_3)_2C(OH)CrNTA(H_2O)]^- + H_2O$	8.4×10^7	5.0-6.4			p.r.	P.b.k. at 325 nm in He-satd. soln. contg. 0.055 mol L^{-1} NTA, (0.42-1.0) $\times 10^{-3}$ mol L^{-1} Cr^{2+}, 0.009 mol L^{-1} acetate, 2.1 mol L^{-1} 2-PrOH and 0.12 mol L^{-1} acetone.	85A499
16.124	**Ethylenediaminetetraacetatochromium(II) ion**							
	$(CH_3)_2\dot{C}OH + CrEDTA^{2-} \rightarrow [(CH_3)_2C(OH)CrEDTA]^{2-}$	2.6×10^7	5			p.r.	P.b.k. in He-satd. soln. contg. EDTA, Cr^{2+}, 0.009 mol L^{-1} acetate, 2.1 mol L^{-1} 2-PrOH and 0.12 mol L^{-1} acetone.	85A499

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.125	**Chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr^{3+} \rightarrow Cr^{2+} + CH_3COCH_3 + H^+$	5.6×10^2	0.7	0.62		chem.	D.k. at 407 nm in soln. contg. $CrC(CH_3)_2OH^{2+}$, 1.13 mol L^{-1} 2-PrOH, 6.96×10^{-2} mol L^{-1} Cr^{3+}, 0.2 mol L^{-1} $HClO_4$ and $(1.8\text{-}30) \times 10^{-4}$ mol L^{-1} Cr^{2+}; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	84A076
16.126	**Hexaamminechromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(NH_3)_6^{3+} \rightarrow$	$<7 \times 10^4$	0-3	0.1	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$ and 4.5×10^{-3}-0.32 mol L^{-1} H^+; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	82A480
16.127	**Pentaaquachlorochromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5Cl^{2+} \rightarrow$	$<3 \times 10^4$	0-3	0.1	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$ and 4.5×10^{-3}-0.32 mol L^{-1} H^+; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	82A480
16.128	**Hexakis(urea)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(urea)_6^{3+} \rightarrow$	$<7 \times 10^4$	0-3	0.1	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$ and 4.5×10^{-3}-0.32 mol L^{-1} H^+; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	82A480
16.129	**Tetraaquabis(pyridine)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + cis\text{-}Cr(H_2O)_4(py)_2^{3+} \rightarrow CH_3COCH_3 + H^+ + cis\text{-}Cr(H_2O)_4(py)_2^{2+}$	$\sim 10^5$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$, Cr^{2+}, $Cr(py)_2^{3+}$, 1 mol L^{-1} 2-PrOH, and 0.1 mol L^{-1} $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A209
16.130	**Pentaaqua(pyridine)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(py)^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(py)^{2+}$	$<5 \times 10^4$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$, Cr^{2+}, $Cr(py)^{3+}$, 1 mol L^{-1} 2-PrOH, and 0.1 mol L^{-1} $HClO_4$; too slow to measure; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A209
16.131	**Pentaaqua(4-*tert*-butylpyridine)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(4\text{-}tert\text{-}Bupy)^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(4\text{-}tert\text{-}Bupy)^{2+}$	$<5 \times 10^4$	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$, Cr^{2+}, $Cr(4\text{-}tert\text{-}Bupy)^{3+}$, 1 mol L^{-1} 2-PrOH, and 0.1 mol L^{-1} $HClO_4$; too slow to measure; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A209
16.132	**Pentaaqua(3-chloropyridine)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(3\text{-}Clpy)^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(3\text{-}Clpy)^{2+}$	4.7×10^6	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$, $1\text{-}7 \times 10^{-5}$ mol L^{-1} Cr^{2+}, $2\text{-}3 \times 10^{-4}$ mol L^{-1} $Cr(3\text{-}Clpy)^{3+}$, 1 mol L^{-1} 2-PrOH, and 0.1 mol L^{-1} $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A209

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.133	**Pentaaqua(4-chloropyridine)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(4\text{-Clpy})^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(4\text{-Clpy})^{2+}$	5.1×10^5	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$, 1-4 $\times 10^{-5}$ mol L^{-1} Cr^{2+}, 3.5×10^{-4} mol L^{-1} $Cr(4\text{-Clpy})^{3+}$, 1 mol L^{-1} 2-PrOH, and 0.1 mol L^{-1} $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A209
16.134	**Pentaaqua(3-cyanopyridine)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(3\text{-CNpy})^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(3\text{-CNpy})^{2+}$	1.8×10^8	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$, 1-8 $\times 10^{-5}$ mol L^{-1} Cr^{2+}, 2-3 $\times 10^{-4}$ mol L^{-1} $Cr(3\text{-CNpy})^{3+}$, 1 mol L^{-1} 2-PrOH, and 0.1 mol L^{-1} $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A209
16.135	**Pentaaqua(4-cyanopyridine)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(4\text{-CNpy})^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(4\text{-CNpy})^{2+}$	5.3×10^8	1	1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$, 7-37 $\times 10^{-4}$ mol L^{-1} Cr^{2+}, 2-3 $\times 10^{-4}$ mol L^{-1} $Cr(4\text{-CNpy})^{3+}$, 1 mol L^{-1} 2-PrOH, and 0.1 mol L^{-1} $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A209
16.136	**Tris(4,4′-dimethyl-2,2′-bipyridine)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(4,4'\text{-}Me_2bpy)_3^{3+} \rightarrow CH_3COCH_3 + Cr(4,4'\text{-}Me_2bpy)_3^{2+} + H^+$	2×10^9	~0			p.r.	P.b.k. at 480 nm in soln. contg. 1 mol L^{-1} HCl and 2-PrOH.	81A060
16.137	**Tris(1,10-phenanthroline)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(phen)_3^{3+} \rightarrow CH_3COCH_3 + Cr(phen)_3^{2+} + H^+$	4.1×10^9	~0			p.r.	P.b.k. at 480 nm in soln. contg. 1 mol L^{-1} HCl and 2-PrOH.	81A060
16.138	**Tris(5-bromo-1,10-phenanthroline)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(5\text{-Brphen})_3^{3+} \rightarrow CH_3COCH_3 + Cr(5\text{-Brphen})_3^{2+} + H^+$	3.8×10^9	~0			p.r.	P.b.k. at 420 nm in soln. contg. 1 mol L^{-1} HCl and 2-PrOH.	81A060
16.139	**Tris(5-chloro-1,10-phenanthroline)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(5\text{-Clphen})_3^{3+} \rightarrow CH_3COCH_3 + Cr(5\text{-Clphen})_3^{2+} + H^+$	2.8×10^9	~0			p.r.	P.b.k. at 400 nm in soln. contg. 1 mol L^{-1} HCl and 2-PrOH.	81A060
16.140	**Tris(5-methyl-1,10-phenanthroline)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(5\text{-Mephen})_3^{3+} \rightarrow CH_3COCH_3 + Cr(5\text{-Mephen})_3^{2+} + H^+$	3.1×10^9	~0			p.r.	P.b.k. at 400 nm in soln. contg. 1 mol L^{-1} HCl and 2-PrOH.	81A060
16.141	**Tris(5,6-dimethyl-1,10-phenanthroline)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(5,6\text{-}Me_2phen)_3^{3+} \rightarrow CH_3COCH_3 + Cr(5,6\text{-}Me_2phen)_3^{2+} + H^+$	3.6×10^9	~0			p.r.	P.b.k. at 420 nm in soln. contg. 1 mol L^{-1} HCl and 2-PrOH.	81A060
16.142	**Pentaaqua(imidazole)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(Im)^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(Im)^{2+}$	6.6×10^5	0.3	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.5 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	91A514

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.143	**Pentaaqua(4,5-dichloroimidazole)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(4,5\text{-}Cl_2Im)^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(4,5\text{-}Cl_2Im)^{2+}$	1.6×10^6	0.3	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.5 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	91A514
16.144	**Pentaaqua(1-methylimidazole)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(1\text{-}MeIm)^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(1\text{-}MeIm)^{2+}$	1.1×10^5	0.3	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.5 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	91A514
16.145	**Pentaaqua(2-methylimidazole)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(2\text{-}MeIm)^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(2\text{-}MeIm)^{2+}$	2.1×10^5	0.3	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.5 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	91A514
16.146	**Pentaaqua(4-methylimidazole)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(4\text{-}MeIm)^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(4\text{-}MeIm)^{2+}$	3.8×10^5	0.3	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.5 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	91A514
16.147	**Pentaaqua(4-methyl-5-(aminocarbonyl)imidazole)chromium(III) ion**							
	$(CH_3)_2\dot{C}OH + Cr(H_2O)_5(4\text{-}Me\text{-}5\text{-}CONH_2Im)^{3+} \rightarrow CH_3COCH_3 + H^+ + Cr(H_2O)_5(4\text{-}Me\text{-}5\text{-}CONH_2Im)^{2+}$	7.2×10^5	0.3	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.5 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	91A514
16.148	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatochromate(III) ion**							
	$(CH_3)_2\dot{C}OH + CrTPPS^{3-} \rightarrow CH_3COCH_3 + H^+ + [CrTPPS]^{\bullet 4-}$	8.0×10^8	5.1			p.r.	P.b.k. at 680 nm in N_2O-satd. soln. contg. 5% 2-PrOH.	92A175
16.149	**Chromium(III) mesoporphyrin**							
	$(CH_3)_2\dot{C}O^- + Cr^{III}MP \rightarrow CH_3COCH_3 + [Cr^{III}MP]^{\bullet -}$	*5.9×10^8*	*12.1*			p.r.	*P.b.k. at 680 nm in N_2O-satd. soln. contg. 5%* 2-PrOH.	92A175
	$(CH_3)_2\dot{C}OH + Cr^{III}MP \rightarrow CH_3COCH_3 + H^+ + [Cr^{III}MP]^{\bullet -}$	$\leq 4 \times 10^7$	6.6			p.r.	P.b.k. at 680 nm in N_2O-satd. soln. contg. 5% 2-PrOH.	92A175
16.150	**Chromate(VI) ion**							
	$(CH_3)_2\dot{C}O^- + CrO_4^{2-} \rightarrow CH_3COCH_3 + CrO_4^{3-}$	9×10^8			298	p.r.	P.b.k. at 250-430 nm in Ar-satd. soln. contg. 0.5 mol L^{-1} NaOH and 0.1 mol L^{-1} 2-PrOH.	95A002
16.151	**Copper(I) ion**							
	$(CH_3)_2\dot{C}OH + Cu^+ \rightarrow$	$\sim 5 \times 10^9$	4.5			p.r.	Estd. from growth and decay of absorption in soln. contg. 2-PrOH and Cu^{2+}.	78A322
16.152	***Copper(II) ion***							
	$(CH_3)_2\dot{C}OH + Cu^{2+} \rightarrow Cu^+ + CH_3COCH_3 + H^+$	5.0×10^7	6			p.r.	D.k. at ~300 nm (radical) in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	80A277
		5.2×10^7	2-5			p.r.	P.b.k. at 320 nm ($Cu^ICH_2CHCONH_2$) in soln. contg. 2-PrOH and 0.01 mol L^{-1} acrylamide.	78A322
		5.0×10^7	≤ 3			p.r.	D.k.at 240-300 nm in soln. contg. 1 mol L^{-1} 2-PrOH.	78A322

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.152	**Copper(II) ion** — Continued							
		4.5×10^7	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} 2-PrOH.	72A018
16.153	***cis*-Diaqua(nitrilotriacetato)copper(II) ion**							
	$(CH_3)_2\dot{C}OH + cis\text{-}[Cu(NTA)(H_2O)_2]^- \rightarrow cis\text{-}[HOC(CH_3)_2Cu(NTA)(H_2O)]^- + H_2O$	2.2×10^7	5-8			p.r.	P.b.k. in N_2O-satd. soln. contg. $CuSO_4$, nitrilotriacetate ion and 2-PrOH.	86B151
16.154	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecopper(II) ion**							
	$(CH_3)_2\dot{C}OH + Cu(4,11\text{-dieneN}_4)^{2+} \rightarrow Cu(4,11\text{-dieneN}_4)^+ + CH_3COCH_3 + H^+$	$\leq 2 \times 10^6$	3.5-10			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	80A189
	$(CH_3)_2\dot{C}O^- + Cu(4,11\text{-dieneN}_4)^{2+} \rightarrow Cu(4,11\text{-dieneN}_4)^+ + CH_3COCH_3$	9.0×10^8	12.5			p.r.	P.b.k. at 410 nm; no redn. obs. in neutral soln.	761039
16.155	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatocuprate(II) ion**							
	$(CH_3)_2\dot{C}OH + CuTPPS^{4-} \rightarrow CH_3COCH_3 + H^+ + [CuTPPS]^{\cdot 5-}$	3.4×10^8	2.9		294	p.r.	P.b.k. at 650 nm in deaerated soln. contg. 2-PrOH.	92A390
16.156	**Europium(II) ion**							
	$(CH_3)_2\dot{C}OH + Eu^{2+} + H^+ \rightarrow 2\text{-PrOH} + Eu^{3+}$	1.5×10^5	1.4		298	chem.	D.k. at 407 nm in soln. contg. 3 mol L^{-1} 2-PrOH, 8.0×10^{-4} mol L^{-1} $CrC(CH_3)_2OH^{2+}$ and 0.037 mol L^{-1} HCl or $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$. $k = 3.1 \times 10^4$ L $mol^{-1}\ s^{-1}$ in D_2O.	84A076
16.157	**Europium(III) ion**							
	$(CH_3)_2\dot{C}OH + Eu^{3+} \rightarrow CH_3COCH_3 + Eu^{2+} + H^+$	3.7×10^4	0.4		298	chem.	D.k. at 407 nm in soln. contg. 1.14 mol L^{-1} 2-PrOH, 8.0×10^{-4} mol L^{-1} $CrC(CH_3)_2OH^{2+}$ and 0.4 mol L^{-1} $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$. $k = 8.8 \times 10^3$ L $mol^{-1}\ s^{-1}$ in D_2O. Unexplained discrepancy in these data.	84A076
		$\sim 8 \times 10^8$	1.2			p.r.	P.b.k. at 250 nm in N_2O-satd. soln. contg. 2-PrOH, 10^{-2} mol L^{-1} Eu_2O_3 and $HClO_4$. Unexplained discrepancy in these data.	86A409
16.158	**Iron(II) ion**							
	$(CH_3)_2\dot{C}OH + Fe^{2+} \rightarrow$	2.9×10^6	~2			p.r.	Estd. from change in abs. at 250 nm; product suggested to be $Fe(H_2O)_5C(OH)(CH_3)_2^{2+}$.	751166
16.159	**Iron(II) protoporphyrin (Heme)**							
	$(CH_3)_2\dot{C}OH + Fe(II)PP \rightarrow$ addn.	6×10^8	10			p.r.	P.b.k. in N_2O-satd. soln. contg. 2×10^{-5} mol L^{-1} Fe(II)PP and 0.1 mol L^{-1} 2-PrOH.	85A006
16.160	**Iron(II) deuteroporphyrin IX (Deuteroheme)**							
	$(CH_3)_2\dot{C}O^- + Fe(II)DP \rightarrow CH_3COCH_3 + Fe(I)DP$	6.3×10^8	alk.			p.r.	D.k. at 583 nm in soln. contg. 5.9 mol L^{-1} 2-PrOH and 0.67 mol L^{-1} acetone.	84A345
	$(CH_3)_2\dot{C}OH + Fe(II)DP \rightarrow CH_3COCH_3 + H^+ + Fe(I)DP$	6.3×10^8	7			p.r.	Abs. changes in soln. contg. 0.7 mol L^{-1} acetone and 50% 2-PrOH; deuterohemin was chemically reduced by dithionite.	81A123
16.161	**Iron(III) ion**							
	$(CH_3)_2\dot{C}OH + Fe^{3+} \rightarrow Fe^{2+} + H^+ + CH_3COCH_3$	5.8×10^8					Unpubl. data, C.N.Barnes and G.V.Buxton.	78A322
		1.8×10^8	~1			γ-r.	C.k.; obs. $C(NO_2)_3^-$ and Fe^{2+} yields; rel. to $k((CH_3)_2\dot{C}OH + TNM) = 5 \times 10^9$ L $mol^{-1}\ s^{-1}$.	77G411

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.161	**Iron(III) ion — Continued**							
		4.5×10^8	~1	1		p.r.	D.k. at 270 nm in soln. contg. 1 mol L^{-1} 2-PrOH, 2×10^{-4} mol L^{-1} $Fe(ClO_4)_3$ and 0.5 mol L^{-1} $HClO_4$.	741074
16.162	**Pentacyano(nitrosyl)ferrate(III) ion**							
	$(CH_3)_2\dot{C}OH + Fe(CN)_5(NO)^{2-} \rightarrow Fe(CN)_5NO^{3-} + H^+ + CH_3COCH_3$	2.8×10^9	7			p.r.	P.b.k. at 435 nm in N_2O- or Ar-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH and 5×10^{-4} mol L^{-1} substrate, slower reaction following hydrated electron reaction.	86A306
		2.9×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	771120
16.163	**Ferricyanide ion**							
	$(CH_3)_2\dot{C}OH + Fe(CN)_6^{3-} \rightarrow CH_3COCH_3 + H^+ + Fe(CN)_6^{4-}$	5.6×10^9	7.0			p.r.	D.k. at 420 nm.	731104
		4.7×10^9	7			p.r.	D.k. at 410 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	690522
16.164	**Tris(1,10-phenanthroline)iron(III) ion**							
	$(CH_3)_2\dot{C}OH + Fe(phen)_3^{3+} \rightarrow Fe(phen)_3^{2+} + CH_3COCH_3 + H^+$	4.1×10^9	~1			p.r.	P.b.k. at 490 nm in soln. contg. 0.1-1 mol L^{-1} 2-PrOH and $(0.4\text{-}1.0) \times 10^{-4}$ mol L^{-1} complex.	85A284
16.165	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatoiron(III) ion**							
	$(CH_3)_2\dot{C}OH + FeTMpyP^{5+} \rightarrow CH_3COCH_3 + H^+ + FeTMpyP^{4+}$	1.7×10^9	8.5-9.5			p.r.	D.k. at 497 nm, as well as p.b.k. at 562 nm, in N_2O-satd. soln. contg. 0.01 mol L^{-1} 2-PrOH.	*91A380*
		1.0×10^9	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	84A426
16.166	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatoferrate(III) ion**							
	$(CH_3)_2\dot{C}OH + FeTPPS^{3-} \rightarrow FeTPPS^{4-} + H^+ + CH_3COCH_3$	9.0×10^8	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	84A426
16.167	**5,10,15,20-Tetrakis[4-(*N,N,N*-trimethylammonio)phenyl]porphinatoiron(III) ion**							
	$(CH_3)_2\dot{C}OH + FeTAPP^{5+} \rightarrow FeTAPP^{4+} + H^+ + CH_3COCH_3$	1.2×10^9	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	84A426
16.168	**Iron(III) deuteroporphyrin IX (Deuterohemin)**							
	$(CH_3)_2\dot{C}O^- + Fe(III)DP \rightarrow Fe(II)DP + H^+ + CH_3COCH_3$	9×10^8	~13			p.r.	D.k. in soln. contg. 50% 2-PrOH.	*81A123*
	$(CH_3)_2\dot{C}OH + Fe(III)DP \rightarrow Fe(II)DP + H^+ + CH_3COCH_3$	3.7×10^8	7.2			p.r.	D.k. in Ar-satd. soln. contg. 50% 2-PrOH and 3.4×10^{-2} mol L^{-1} acetone.	80A011
16.169	**Iron(III) deuteroporphyrin, dimethyl ester**							
	$(CH_3)_2\dot{C}OH + DPDMEFe^{III} \rightarrow DPDMEFe^{II} + H^+ + CH_3COCH_3$	1.3×10^9	~3			p.r.	Abs. changes in soln. contg. 1.2×10^{-3} mol L^{-1} $HClO_4$ and 50% 2-PrOH.	82A222
16.170	**Hemin c**							
	$(CH_3)_2\dot{C}OH + Hem\text{-}Fe^{III} \rightarrow Hem\text{-}Fe^{II} + H^+ + CH_3COCH_3$	2.8×10^9	7.0			p.r.	P.b.k. at 413 nm in N_2O-satd. soln. contg. 0.04 mol L^{-1} 2-PrOH.	75A241
16.171	**Ferrate(VI) ion**							
	$(CH_3)_2\dot{C}OH + FeO_4^{2-} \rightarrow CH_3COCH_3 + H^+ + FeO_4^{3-}$	3.0×10^9	10.4		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	89A354
16.172	**Hexahydroxygallate(II) ion**							
	$(CH_3)_2\dot{C}O^- + Ga(OH)_6^{4-} \rightarrow$	1.7×10^9	12.0	→0		p.r.	D.k. in soln. contg. 2-PrOH; Ga(II) from e_{aq}^- + Ga(III).	79A190

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.173	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatogallium(III) ion**							
	$(CH_3)_2\dot{C}OH + GaTMpyP^{5+} \rightarrow CH_3COCH_3 + H^+ + [GaTMpyP]^{\cdot 4+}$	1.7×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	86A138
16.174	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatogermanium(IV) ion**							
	$(CH_3)_2\dot{C}OH + GeTMpyP^{6+} \rightarrow CH_3COCH_3 + H^+ + [GeTMpyP]^{\cdot 5+}$	2.1×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	86A138
16.175	**Hydrogen ion**							
	$(CH_3)_2\dot{C}OH + H^+ \rightarrow (CH_3)_2\dot{C}OH_2^+$	6.4×10^7				chem.	Esr line broadening in soln. contg. Ti(III), H_2O_2 and 2-PrOH.	689058
		7.2×10^7			301	phot.	Esr line broadening in soln. contg. 10% acetone and 5% 2-PrOH.	66D162
16.176	**Mercury(I) cyanide**							
	$(CH_3)_2\dot{C}OH + HgCN \rightarrow$	2.4×10^9				p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. 2-PrOH and $Hg(CN)_2$; used $2k(HgCN + HgCN) = 3.4 \times 10^9$ L mol^{-1} s^{-1}.	751203
16.177	**Mercury(II) bromide**							
	$(CH_3)_2\dot{C}OH + HgBr_2 \rightarrow HgBr + Br^- + H^+ + CH_3COCH_3$	2.4×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761042
16.178	**Mercury(II) thiocyanate**							
	$(CH_3)_2\dot{C}OH + Hg(SCN)_2 \rightarrow HgSCN + SCN^- + H^+ + CH_3COCH_3$	2.2×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761042
16.179	**Mercury(II) chloride**							
	$(CH_3)_2\dot{C}OH + HgCl_2 \rightarrow HgCl + Cl^- + H^+ + CH_3COCH_3$	2.0×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH; see also *[761042]*.	730043
16.180	**Mercury(II) iodide**							
	$(CH_3)_2\dot{C}OH + HgI_2 \rightarrow HgI + I^- + H^+ + CH_3COCH_3$	1.0×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	78A165
		2.0×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761042
16.181	**Iodate ion**							
	$(CH_3)_2\dot{C}O^- + IO_3^- \rightarrow CH_3COCH_3 + IO_3^{2-}$	1.0×10^9	−14			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.001 mol L^{-1} IO_3^- and 0.1 mol L^{-1} 2-PrOH and 1.0 mol L^{-1} OH^-.	85A037
16.182	**Indium(II) ion**							
	$(CH_3)_2\dot{C}OH + In^{2+} \rightarrow CH_3COCH_3 + H^+ + In^+$	9×10^8	2.7-4.3	0.09	295	p.r.	D.k. in He-satd. soln. contg. In(III) and 0.05 mol L^{-1} 2-PrOH; value obtained by computer fit.	84A008
16.183	**Indium(III) ion**							
	$(CH_3)_2\dot{C}OH + In^{3+} \rightarrow$	$<3 \times 10^6$	3			p.r.	No In(II) formed in soln. contg. 2-PrOH, 1 mol L^{-1} $HClO_4$, 0.01 mol L^{-1} acetone and 0.001 mol L^{-1} In(III).	84A008
16.184	**Bis(2,2′-bipyridine)([2,2′-bipyridin]-3-yl-*C*,*N*′)iridium(III) ion**							
	$(CH_3)_2\dot{C}OH + Ir(bpy)_2(C^3,N'\text{-bpy})^{2+} \rightarrow Ir(bpy)_2(C^3,N'\text{-bpy})^+ + CH_3COCH_3 + H^+$	2.0×10^8	>3			p.r.	P.b.k. in N_2O-satd. soln. contg. 1.0 mol L^{-1} 2-PrOH.	85A160
16.185	**Bis(2,2′-bipyridine)([2,2′-bipyridin]-3-yl-*C*,*N*′)iridium(III) ion, conjugate monoacid**							
	$(CH_3)_2\dot{C}OH + Ir(bpy)_2(C^3,N'\text{-Hbpy})^{3+} \rightarrow Ir(bpy)_2(C^3,N'\text{-Hbpy})^{2+} + CH_3COCH_3 + H^+$	1.4×10^9	1-2			p.r.	P.b.k. in N_2O-satd. soln. contg. 1.0 mol L^{-1} 2-PrOH.	85A160

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.186	**Hexachloroiridate(IV) ion**							
	$(CH_3)_2\dot{C}OH + IrCl_6^{2-} \rightarrow CH_3COCH_3 + H^+ + IrCl_6^{3-}$	4.7×10^9	4-6		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. 2-PrOH.	82A041
16.187	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(II) ion**							
	$(CH_3)_2\dot{C}OH + MnTMpyP^{4+} \rightarrow [MnTMpyP]^{\bullet 3+} + CH_3COCH_3 + H^+$	1.8×10^9	6.8			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.188	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(II) ion**							
	$(CH_3)_2\dot{C}OH + MnTPPS^{4-} \rightarrow [MnTPPS]^{\bullet 5-} + CH_3COCH_3 + H^+$	1.8×10^8	6.8			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
	$(CH_3)_2\dot{C}O^- + MnTPPS^{4-} \rightarrow [MnTPPS]^{\bullet 5-} + CH_3COCH_3$	8.4×10^8	12.4			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.189	**5,10,15,20-Tetrakis(4-pyridyl)porphinatomanganese(III) ion**							
	$(CH_3)_2\dot{C}OH + MnTpyP^+ \rightarrow MnTpyP + CH_3COCH_3 + H^+$	1.6×10^9	4.0, 6.8			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.190	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion**							
	$(CH_3)_2\dot{C}OH + MnTMpyP^{5+} \rightarrow CH_3COCH_3 + H^+ + MnTMpyP^{4+}$	2.5×10^9	6.7-9.3			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
		1.4×10^9	3.1, 6.8			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.191	**Aqua(hydroxy)tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion**							
	$(CH_3)_2\dot{C}OH + (H_2O)(OH)MnTMpyP^{4+} \rightarrow (H_2O)MnTMpyP^{4+} + CH_3COCH_3 + H_2O$	1.6×10^9	8.9			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.192	**Bis(hydroxy)tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion**							
	$(CH_3)_2\dot{C}O^- + (OH)_2MnTMpyP^{3+} \rightarrow (OH)MnTMpyP^{3+} + CH_3COCH_3 + OH^-$	2.3×10^9 2.2×10^9	11.9 12.4			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
		8.0×10^8	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	84A426
16.193	**5,10,15,20-Tetrakis[4-(*N,N,N*-trimethylammonio)phenyl]porphinatomanganese(III) ion**							
	$(CH_3)_2\dot{C}OH + MnTAPP^{5+} \rightarrow CH_3COCH_3 + H^+ + MnTAPP^{4+}$	2.7×10^9	6.7			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
16.194	**α,α,α,β-Tetrakis[2-(*N*-methylisonicotinamido)phenyl]porphinatomanganese(III) ion**							
	$(CH_3)_2\dot{C}OH + MnPFP^{5+} \rightarrow CH_3COCH_3 + H^+ + MnPFP^{4+}$	1.5×10^9	7.0			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
16.195	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion**							
	$(CH_3)_2\dot{C}OH + MnTPPS^{3-} \rightarrow MnTPPS^{4-} + CH_3COCH_3 + H^+$	1.5×10^9	3.1, 6.8			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.196	**Aqua(hydroxy)tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion**							
	$(CH_3)_2\dot{C}OH + (H_2O)(OH)MnTPPS^{4-} \rightarrow (H_2O)MnTPPS^{4-} + CH_3COCH_3 + H_2O$	1.7×10^9	8.9			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
16.197	**Bis(hydroxy)tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion**							
	$(CH_3)_2\dot{C}O^- + (OH)_2MnTPPS^{5-} \rightarrow (OH)MnTPPS^{5-} + CH_3COCH_3 + OH^-$	1.7×10^9	11.9, 12.6			p.r.	Abs. changes in soln. contg. 2-PrOH.	84A120
		7.0×10^8	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	84A426
16.198	**Permanganate ion**							
	$(CH_3)_2\dot{C}OH + MnO_4^- \rightarrow CH_3COCH_3 + H^+ + MnO_4^{2-}$	7.2×10^9	10.4		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	89A354
		4.2×10^9	7.0			p.r.	D.k. at 545 nm in N_2O-satd. soln. contg. 2-PrOH.	731104

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.199	**18-Molybdodiphosphate ion(6-)**							
	$(CH_3)_2\dot{C}OH + P_2Mo_{18}O_{62}^{6-} \rightarrow CH_3COCH_3 + HP_2Mo_{18}O_{62}^{6-}$	3.9×10^9	2		295	p.r.	P.b.k. in N_2O-satd. (2.5×10^{-2} mol L^{-1}) soln. contg. 0.5 mol L^{-1} 2-PrOH and ~10^{-4} mol L^{-1} heteropolymolybdophosphate.	82A107
16.200	**Azide ion**							
	$(CH_3)_2\dot{C}OH + N_3^- \rightarrow$					p.r.	D.k. of $(CH_3)_2\dot{C}OH$ unaffected by addn. of 0.1 mol L^{-1} NaN_3.	82A005
16.201	**Nitrous oxide**							
	$(CH_3)_2\dot{C}O^- + N_2O \rightarrow$	3.8×10^4	13.5			γ-r.	Estd. from G(acetone) based on an assumed mechanism and values for competing reactions.	720167
16.202	**Nitrate ion**							
	$(CH_3)_2\dot{C}OH + NO_3^- \rightarrow$	~3×10^1				γ-r.	Calcd. from G for destruction of NO_3^- in soln. contg. 0.1-0.2 mol L^{-1} acetone, 0.2-0.4 mol L^{-1} 2-PrOH, 2.5×10^{-4} mol L^{-1} Ag^+ and 10^{-3} mol L^{-1} SDS assuming G(R) = 5.8 and $2k$(R + R) = 1.4×10^9 L mol^{-1} s^{-1}.	80N062
16.203	**Nickel(I) ion**							
	$(CH_3)_2\dot{C}OH + Ni^+ \rightarrow NiCOH(CH_3)_2$	1.4×10^9				p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. $NiSO_4$ and 2-PrOH. Value obtained by computer fit.	741037
16.204	**Nickel(II) ion**							
	$(CH_3)_2\dot{C}OH + Ni^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in Ni^+ in 0.1 mol L^{-1} Ni^{2+} on addn. of 0.1 mol L^{-1} 2-PrOH.	751027
16.205	***N*-Methyl-5,10,15,20-tetrakis(4-sulfonatophenyl)porphinatonickelate(II) ion**							
	$(CH_3)_2\dot{C}OH + Ni(N\text{-}Me)TPPS^{3-} \rightarrow [Ni(N\text{-}Me)TPPS]^{4-} + CH_3COCH_3 + H^+$	1.6×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	92G183
16.206	**Tris(dimethylglyoximato)nickelate(IV) ion**							
	$(CH_3)_2\dot{C}O^- + [Ni^{IV}(dmg)_3]^{2-} \rightarrow CH_3COCH_3 + [Ni^{III}(dmg)_3]^{3-}$	1.7×10^9	12.5		294	p.r.	P.b.k. in N_2O-satd. soln. contg. 10% 2-PrOH.	85A354
16.207	**3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonickel(IV) ion**							
	$(CH_3)_2\dot{C}OH + Ni^{IV}L^{2+} \rightarrow CH_3COCH_3 + H^+ + [Ni^{III}L]^+$	2.7×10^9	2.5-3.7		294	p.r.	P.b.k. at 500 or 430 nm in N_2O-satd. soln. contg. 10% 2-PrOH.	85A354
16.208	**Dioxoneptunium(VI) ion**							
	$(CH_3)_2\dot{C}OH + NpO_2^{2+} \rightarrow CH_3COCH_3 + H^+ + NpO_2^+$	1.8×10^{10}	1			p.r.	C.k. in soln. contg. 0.5 mol L^{-1} 2-PrOH, 3.2×10^{-3} mol L^{-1} 2,2′-bipyridine and 0.1 mol L^{-1} $HClO_4$; rel. to $k((CH_3)_2\dot{C}OH + bpyH^+) = 7.4 \times 10^8$ L mol^{-1} s^{-1}.	94A345
		1.8×10^{10}	1			p.r.	C.k. in soln. contg. 0.5 mol L^{-1} 2-PrOH, 1.9×10^{-3} mol L^{-1} 1,10-phenanthroline and 0.1 mol L^{-1} $HClO_4$; rel. to $k((CH_3)_2\dot{C}OH + phenH^+) = 3 \times 10^9$ L mol^{-1} s^{-1}.	94A345
16.209	**Hydrogen peroxide**							
	$(CH_3)_2\dot{C}OH + H_2O_2 \rightarrow CH_3COCH_3 + H_2O + {}^{\bullet}OH$	7×10^5				chem.	Esr study in soln. contg. Ti(III), H_2O_2 and 2-PrOH.	88D348
		2.3×10^5	6.8			γ-r.	Estd. from obs. $G(H_2O_2)$ in N_2O-satd. soln. contg. 2-PrOH.	87G036
		5×10^5	1,7			phot.	Esr study of effect of $[H_2O_2]$ on [R] in soln. contg. 2-PrOH and acetone; used $2k$(R + R) = 1.4×10^9 L mol^{-1} s^{-1}.	715227

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.210	**Hydroxide ion**							
	$(CH_3)_2\dot{C}OH + OH^- \rightarrow (CH_3)_2\dot{C}O^- + H_2O$	7.5×10^9	10.4-11.0			p.r.	Condy. changes in soln. contg. 1 mol L^{-1} acetone, $k_r = 1.4 \times 10^6$ L mol^{-1} s^{-1} ; k_f calcd. from $pK_a = 12.00$.	80A323
		9×10^9	11-12			*e*-r.	Esr line broadening in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH; $k_r = 1.8 \times 10^6$ L mol^{-1} s^{-1} ($pK_a = 12.03$).	735065
16.211	**Oxygen**							
	$(CH_3)_2\dot{C}OH + O_2 \rightarrow (CH_3)_2C(OH)OO^{\cdot}$	4.5×10^9	~0.3			p.r.	D.k. at 290-300 nm in air-satd. soln. contg. 1 mol L^{-1} 2-PrOH and 0.5 mol L^{-1} $HClO_4$.	741074
		3.5×10^9	5-6			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and *p*-nitroacetophenone; rel. to $k((CH_3)_2\dot{C}HOH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	710618
		4.2×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and ferricyanide; rel. to $k((CH_3)_2\dot{C}HOH + Fe(CN)_6^{3-}) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	690522
16.212	**Lead(I) ions**							
	$(CH_3)_2\dot{C}OH + Pb^+ \rightarrow PbC(CH_3)_2OH^+$	1.1×10^9				p.r.	D.k. at 300 nm (Pb^+) in soln. contg. 5×10^{-4} mol L^{-1} Pb^{2+} and 0.05 mol L^{-1} 2-PrOH knowing initial [R] and [Pb^+]; cor. for R + R: Pb^+ is formed initially by $e_{aq}^- + Pb^{2+}$.	761170
16.213	**Lead(II) ions**							
	$(CH_3)_2\dot{C}OH + Pb^{2+} \rightarrow CH_3COCH_3 + Pb^+ + H^+$	3.0×10^4				p.r.	P.b.k. at 300 nm in 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} Pb^{2+} during 100 μs after pulse.	761170
16.214	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatolead(II) ion**							
	$(CH_3)_2\dot{C}OH + PbTMpyP^{4+} \rightarrow CH_3COCH_3 + H^+ + [PbTMpyP]^{\cdot 3+}$	2.0×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	86A138
16.215	**Hexahydroxyplumbate(IV) ion**							
	$(CH_3)_2\dot{C}O^- + Pb(OH)_6^{2-} \rightarrow CH_3COCH_3 + Pb(OH)_4^- + 2\ OH^-$	1.3×10^9	alk.			p.r.	P.b.k. in soln. contg. 0.1 mol L^{-1} acetone.	90A095
16.216	**Palladium(II) ion**							
	$(CH_3)_2\dot{C}OH + Pd^{2+} \rightarrow PdCOH(CH_3)_2^+ \rightarrow Pd^+ + H^+ + CH_3COCH_3$	1.4×10^7	0			p.r.	P.b.k. at 290 nm in soln. contg. 0.1-1 mol L^{-1} 2-PrOH and (5-30) $\times 10^{-5}$ mol L^{-1} Pd^{2+} and 1 mol L^{-1} $HClO_4$.	94A518
		1.7×10^7	0			p.r.	P.b.k. at 290 nm in soln. contg. 2-PrOH and (5-30) $\times 10^{-5}$ mol L^{-1} Pd^{2+} and 1 mol L^{-1} $HClO_4$.	94A210
16.217	**Tetraamminepalladium(II) ion**							
	$(CH_3)_2\dot{C}OH + Pd(NH_3)_4^{2+} \rightarrow CH_3COCH_3 + H^+ + Pd(I)$	$\sim 7 \times 10^7$				p.r.	P.b.k. in Ar-satd. soln. contg. 0.3 mol L^{-1} 2-PrOH, 2×10^{-4} mol L^{-1} $Pd(NH_3)_2Cl_2$ and poly(ethyleneimine).	92A179
16.218	**Dichlorobis(ethylenediamine)platinum(IV) ion**							
	$(CH_3)_2\dot{C}OH + Pt(en)_2Cl_2^{2+} \rightarrow$ redn.	8.1×10^8	7			p.r.	P.b.k. at 260-340 nm in soln. contg. 2 mol L^{-1} 2-PrOH.	751188
16.219	**Dioxoplutonium(VI) ion**							
	$(CH_3)_2\dot{C}OH + PuO_2^{2+} \rightarrow CH_3COCH_3 + H^+ + PuO_2^+$	1.6×10^{10}	1			p.r.	C.k. in soln. contg. 0.5 mol L^{-1} 2-PrOH, 1.9×10^{-3} mol L^{-1} 1,10-phenanthroline and 0.1 mol L^{-1} $HClO_4$; rel. to $k((CH_3)_2\dot{C}OH + phenH^+) = 3 \times 10^9$ L mol^{-1} s^{-1}.	94A345

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.219	**Dioxoplutonium(VI) ion** — Continued							
		1.5×10^{10}	1			p.r.	C.k. in soln. contg. 0.5 mol L^{-1} 2-PrOH, 3.2×10^{-3} mol L^{-1} 2,2′-bipyridine and 0.1 mol L^{-1} $HClO_4$; rel. to $k((CH_3)_2\dot{C}OH + bpyH^+) = 7.4 \times 10^8$ L mol^{-1} s^{-1}.	94A345
16.220	**Bis(2,2′-bipyridine)rhodium(II) ion**							
	$(CH_3)_2\dot{C}OH + Rh(bpy)_2^{2+} \rightarrow Rh(bpy)_2^{+} + CH_3COCH_3 + H^+$	2×10^9				p.r.	P.b.k. at 360 nm; estd. from increase in obs. rate constant with increasing dose per pulse in soln. contg. $Rh^{III}(bpy)_2$.	83A046
16.221	**Bis(2,2′-bipyridine)dihydroxyrhodium(III) ion**							
	$(CH_3)_2\dot{C}OH + Rh(bpy)_2(OH)_2^{+} \rightarrow CH_3COCH_3 + H^+ + Rh(bpy)_2^{2+}$	2.4×10^8	8.8		298	p.r.	P.b.k. at 360 nm.	83A046
	$(CH_3)_2\dot{C}O^- + Rh(bpy)_2(OH)_2^{+} \rightarrow Rh(bpy)_2^{2+} + CH_3COCH_3 + H^+$	$\sim 10^{10}$	12			p.r.	P.b.k. at 360 nm.	83A046
16.222	**Tris(2,2′-bipyridine)rhodium(III) ion**							
	$(CH_3)_2\dot{C}OH + Rh(bpy)_3^{3+} \rightarrow CH_3COCH_3 + H^+ + Rh(bpy)_3^{2+}$	2.3×10^9			298	p.r.	P.b.k. at 360 nm; $E_a = 15.5$ kJ mol^{-1}; studied at 278-348 K.	83A046
		1.8×10^9	1-10			p.r.	P.b.k. at 270 nm and 485 nm as well as d.k. at 320 and 350 nm in Ar-satd. or N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	81A134
		2.9×10^9	7	0		p.r.	P.b.k.	741167
16.223	**Tris(1,10-phenanthroline)rhodium(III) ion**							
	$(CH_3)_2\dot{C}OH + Rh(phen)_3^{3+} \rightarrow CH_3COCH_3 + H^+ + Rh(phen)_3^{2+}$	3.2×10^9	~7			p.r.	P.b.k. at 365 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} 2-PrOH.	80A227
16.224	**Dihydroxy-5,10,15,20-tetrakis(4-sulfonatophenyl)porphinerhodate(III) ion**							
	$(CH_3)_2\dot{C}O^- + RhTPPS(OH)_2^{5-} \rightarrow RhTPPS(OH)_2^{6-} + CH_3COCH_3$	5.7×10^8	13			p.r.	Abs. changes in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	85A114
16.225	**Hexaammineruthenium(II) ion**							
	$(CH_3)_2\dot{C}OH + Ru(NH_3)_6^{2+} + H^+ \rightarrow 2\text{-PrOH} + Ru(NH_3)_6^{3+}$	6.3×10^6	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. $CrCH(CH_3)_2OH^{2+}$, 1 mol L^{-1} 2-PrOH and 0.003-0.1 mol L^{-1} H^+; acid-dependent $k = 1.35 \times 10^8$ L^2 mol^{-2} s^{-1}; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	87A498
16.226	**Pentaammine(pyridine)ruthenium(II) ion**							
	$(CH_3)_2\dot{C}OH + Ru(NH_3)_5(py)^{2+} + H^+ \rightarrow 2\text{-PrOH} + Ru(NH_3)_5(py)^{3+}$	1.9×10^6	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. $CrCH(CH_3)_2OH^{2+}$, 1 mol L^{-1} 2-PrOH and 0.003-0.1 mol L^{-1} H^+; acid-dependent $k = 2.05 \times 10^7$ L^2 mol^{-2} s^{-1}; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	87A498
16.227	**Pentaammine(3-chloropyridine)ruthenium(II) ion**							
	$(CH_3)_2\dot{C}OH + Ru(NH_3)_5(3\text{-Clpy})^{2+} + H^+ \rightarrow 2\text{-PrOH} + Ru(NH_3)_5(3\text{-Clpy})^{3+}$	1.1×10^6	acid	0.1	298	chem.	D.k. in soln. contg. $CrCH(CH_3)_2OH^{2+}$, 1 mol L^{-1} 2-PrOH and 0.001-0.1 mol L^{-1} H^+; acid-dependent $k = 1.95 \times 10^7$ L^2 mol^{-2} s^{-1}; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	87A498

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.228	**Pentaammine(4-methylpyridine)ruthenium(II) ion**							
	$(CH_3)_2\dot{C}OH + Ru(NH_3)_5(4\text{-Mepy})^{2+} + H^+ \rightarrow$ 2-PrOH + $Ru(NH_3)_5(4\text{-Mepy})^{3+}$	2.4×10^6	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. $CrCH(CH_3)_2OH^{2+}$, 1 mol L^{-1} 2-PrOH and 0.01 mol L^{-1} H^+; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.127 s^{-1}.	87A498
16.229	**Pentaammine(4-*tert*-butylpyridine)ruthenium(II) ion**							
	$(CH_3)_2\dot{C}OH +$ $Ru(NH_3)_5(4\text{-}(CH_3)_3Cpy)^{2+} + H^+ \rightarrow$ 2-PrOH + $Ru(NH_3)_5(4\text{-}(CH_3)_3Cpy)^{3+}$	2.7×10^6	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. $CrCH(CH_3)_2OH^{2+}$, 1 mol L^{-1} 2-PrOH and 0.01 mol L^{-1} H^+; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.127 s^{-1}.	87A498
16.230	**Pentaammine(4-dimethylaminopyridine)ruthenium(II) ion**							
	$(CH_3)_2\dot{C}OH + Ru(NH_3)_5(4\text{-}Me_2Npy)^{2+} + H^+ \rightarrow$ 2-PrOH + $Ru(NH_3)_5(4\text{-}Me_2Npy)^{3+}$	5.6×10^6	acid	0.1	298	chem.	D.k. at 311 nm in soln. contg. $CrCH(CH_3)_2OH^{2+}$, 1 mol L^{-1} 2-PrOH and 0.0002 mol L^{-1} H^+; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.127 s^{-1}.	87A498
16.231	**Tris(2,2′-bipyridine)ruthenium(II) ion**							
	$(CH_3)_2\dot{C}O^- + Ru(bpy)_3^{2+} \rightarrow$ $CH_3COCH_3 + Ru(bpy)_3^+$	7.5×10^9	12.7			p.r.	P.b.k. at 510 nm in soln. contg. 2-PrOH and acetone; *no reaction obs. at pH 7.*	93A299
		3.1×10^9	13	0.1		p.r.	P.b.k. at 510 nm in N_2O-satd. soln. contg. 2-PrOH.	91A218
		4.9×10^9	11-13			p.r.	P.b.k.	78A068
	$(CH_3)_2\dot{C}OH + Ru(bpy)_3^{2+} \rightarrow$	$<10^6$	7			p.r.	No reduction obs.	78A068
16.232	**Tris(2,2′-bipyrazine)ruthenium(II) ion**							
	$(CH_3)_2\dot{C}OH + Ru(bpz)_3^{2+} \rightarrow$ $CH_3COCH_3 + Ru(bpz)_3^+ + H^+$	3.5×10^9	7-11			p.r.	Ar-purged or N_2O-satd. soln. contg. 2-PrOH.	86A422
16.233	**Tris(1,10-phenanthroline)ruthenium(II) ion**							
	$(CH_3)_2\dot{C}O^- + Ru(phen)_3^{2+} \rightarrow$ $CH_3COCH_3 + Ru(phen)_3^+$	3.7×10^9	13			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.25 mol L^{-1} 2-PrOH.	80A227
	$(CH_3)_2\dot{C}OH + Ru(phen)_3^{2+} \rightarrow$	8×10^8	1			p.r.	P.b.k. in Ar-satd. soln.	80A227
16.234	**Hexaammineruthenium(III) ion**							
	$(CH_3)_2\dot{C}OH + Ru(NH_3)_6^{3+} \rightarrow$	9.2×10^8	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} 2-PrOH; *e*-transfer.	72A018
16.235	**Pentaammine(chloro)ruthenium(III) ion**							
	$(CH_3)_2\dot{C}OH + Ru(NH_3)_5Cl^{2+} \rightarrow$	1.3×10^9	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} 2-propanol.	771100
16.236	**Pentaammine(nitroso)ruthenium(III) ion**							
	$(CH_3)_2\dot{C}OH + Ru(NH_3)_5NO^{3+} \rightarrow$ $Ru(NH_3)_5NO^{2+} + CH_3COCH_3 + H^+$	5.5×10^8	5.0			p.r.	P.b.k. at 280 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	751049
16.237	**Hydrogen sulfide**							
	$(CH_3)_2\dot{C}OH + H_2S \rightarrow H_2\dot{S}COH(CH_3)_2$		6			p.r.	Effect of [H_2S] on p.b.k. at 380 nm; k(adduct → 2-PrOH + $^{\bullet}SH$) = 8.6×10^5 s^{-1}.	670262
16.238	**Sulfur dioxide**							
	$(CH_3)_2\dot{C}OH + SO_2 \rightarrow CH_3COCH_3 + H^+ + SO_2^{\bullet-}$	2.1×10^9	acid			p.r.	C.k.; obs. formn of 2-$SO_3AQ^{\bullet\square-}$ at 400 nm; rel. to $k((CH_3)_2\dot{C}OH + 2\text{-}SO_3AQ^-) = 3.1 \times 10^9$ L mol^{-1} s^{-1}.	87A083

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.239	**Peroxodisulfate ion**							
	$(CH_3)_2\dot{C}OH + S_2O_8^{2-} \rightarrow CH_3COCH_3 + H^+ + SO_4^{\cdot-} + SO_4^{2-}$	9×10^5			273	γ-r.	Derived from product anal. in soln. contg. peroxodisulfate and 2-PrOH by computer simulation.	88G043
		7.1×10^5			~293	chem.	Esr study in soln. contg. 0.008 mol L^{-1} Ti(III), 0.01 mol L^{-1} H_2O_2, (0-0.025) mol L^{-1} $S_2O_8^{2-}$ and ~0.01 mol L^{-1} 2-PrOH.	84D044
16.240	**Hydrogen peroxomonosulfate ion**							
	$(CH_3)_2\dot{C}OH + HSO_5^- \rightarrow$	3.0×10^6				chem.	Esr study in soln. contg. Ti(III) sulfate, H_2O_2, HSO_5^- and 2-PrOH.	90D226
16.241	**5,10,15,20-Tetrakis(4-pyridyl)porphinatoantimony(V) ion**							
	$(CH_3)_2\dot{C}OH + SbTpyP^{3+} \rightarrow CH_3COCH_3 + H^+ + [SbTpyP]^{\cdot 2+}$	1.8×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	86A138
16.242	**Technetate(VII) ion**							
	$(CH_3)_2\dot{C}OH + TcO_4^- \rightarrow TcO_4^{2-} + CH_3COCH_3 + H^+$	7×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH, or He-satd. soln. contg. acetone and 2-PrOH	89A016
16.243	**Titanium(III) ions**							
	$(CH_3)_2\dot{C}OH + Ti^{3+} + H_2O \rightarrow$ 2-PrOH + $TiO^{2+} + H^+$	2.1×10^6 3.1×10^5	2.8 1.1	0.1	298	chem.	D.k. at 311 nm in soln. contg. $CrC(CH_3)_2OH^{2+}$ and $[H^+] = 0.0015$-0.085 mol L^{-1}; used $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$; $k = 3.6 \times 10^5 + 1.8 \times 10^3/[H^+] + 25/[H^+]^2]/1 + 7.3 \times 10^{-3}/[H^+]$.	87A379
16.244	**Oxotitanium(IV) ion**							
	$(CH_3)_2\dot{C}OH + TiO^{2+} \rightarrow CH_3COCH_3 + TiOH^{2+}$	1.1×10^6	1.1-1.5	1.0	298	chem.	C.k. in soln. contg. $CrC(CH_3)_2OH^{2+}$, 1 mol L^{-1} 2-PrOH and 0.03-0.08 mol L^{-1} H^+; rel. to $k((CH_3)_2\dot{C}OH + Co(NH_3)_6^{3+}) = 4.1 \times 10^5$ L $mol^{-1}\ s^{-1}$.	87A379
16.245	**Thallium(I) ion**							
	$(CH_3)_2\dot{C}O^- + Tl^+ \rightarrow Tl^0 + CH_3COCH_3$	7.1×10^9	11-12	0.006		p.r.	P.b.k. at 325, 420 and 450 nm in soln. contg. acetone and Tl^+ and $[OH^-] < 10^{-2}$ mol L^{-1}.	89C001
		3.0×10^9	13			p.r.	P.b.k. at 420 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH and 1×10^{-4} mol L^{-1} Tl^+; no reaction obs. in neutral or acid soln. See also [79G191].	80A123
16.246	**Dithallium monocation**							
	$(CH_3)_2\dot{C}OH + Tl_2^+ + H^+ \rightarrow$ 2-PrOH + $Tl^+ + Tl^+$	3.0×10^9	6			p.r.	Calcd. from d.k. at 420 nm. and condy. changes in soln. contg. alcohol and Tl^+ assuming values for $2k(Tl_2^+ + Tl_2^+)$, $k(Tl_2^+ + H_2O_2)$ and $2k(R + R)$.	80A123
16.247	**Uranium(III) ion**							
	$(CH_3)_2\dot{C}OH + U^{3+} \rightarrow$	$\leq 1 \times 10^7$	0.3			p.r.	D.k. at 350 nm in He-satd. soln. contg. 0.5 mol L^{-1} $HClO_4$ and 0.1-1 mol L^{-1} 2-PrOH.	85A122
16.248	**Uranyl(VI) ion**							
	$(CH_3)_2\dot{C}OH + UO_2^{2+} \rightarrow CH_3COCH_3 + H^+ + UO_2^+$	1.1×10^8				p.r.	D.k. at 310 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH and $(5\text{-}15) \times 10^{-5}$ mol L^{-1} uranyl sulfate.	89A327
		4.1×10^7	1		295	p.r.	D.k. at 340 nm in soln. contg. $(2.7\text{-}5.2) \times 10^{-3}$ mol L^{-1} uranyl sulfate and 1 mol L^{-1} 2-PrOH.	86G099

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.249	**Uranium(VI)**							
	$(CH_3)_2\dot{C}OH + U(VI) \rightarrow$	2.4×10^9				p.r.	Abs. changes in soln. contg. 0.1 mol L^{-1} H_2SO_4.	94Z077
16.250	**Vanadium(II) ion**							
	$(CH_3)_2\dot{C}OH + V^{2+} + H^+ \rightarrow$ 2-PrOH + V^{3+}	2.1×10^5	~1		298	chem.	D.k. at 311 nm in soln. contg. $CrC(CH_3)_2OH^{2+}$, Cr^{2+} and 1.0 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+}$, ; $k = 3.6 \times 10^4$ L mol^{-1} s^{-1} in D_2O.	83A237
16.251	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinato(oxo)vanadium(IV) ion**							
	$(CH_3)_2\dot{C}OH$ + VOTMpyP^{4+} → VOTMpyP^{3+} + H^+ + CH_3COCH_3	1.6×10^9	7			p.r.	Abs. changes in N_2-satd. buffered soln. contg. 10^{-4} mol L^{-1} metalloporphyrin and 2% 2-PrOH.	87A097
16.252	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinato(oxo)vanadium(IV) ion**							
	$(CH_3)_2\dot{C}OH$ + VOTPPS^{4-} → VOTPPS^{5-} + CH_3COCH_3	4.2×10^8	7			p.r.	Abs. changes in N_2-satd. buffered soln. contg. 10^{-4} mol L^{-1} metalloporphyrin and 2% 2-PrOH.	87A097
16.253	**12-Tungstoferrate ion(5-)**							
	$(CH_3)_2\dot{C}OH + FeW_{12}O_{40}^{5-} \rightarrow CH_3COCH_3 + H^+ + FeW_{12}O_{40}^{6-}$	4.5×10^9	5-6			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. 2-PrOH.	82A271
16.254	**12-Tungstate ion(6-), dihydrogen**							
	$(CH_3)_2\dot{C}OH + H_2W_{12}O_{40}^{6-} \rightarrow CH_3COCH_3 + H^+ + H_2W_{12}O_{40}^{7-}$	1.3×10^9	5-6			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. 2-PrOH.	82A271
16.255	**12-Tungstophosphate ion(3-)**							
	$(CH_3)_2\dot{C}OH + PW_{12}O_{40}^{3-} \rightarrow CH_3COCH_3 + H^+ + PW_{12}O_{40}^{4-}$	2.6×10^9	~1			p.r.	P.b.k. at 740 nm in Ar-satd. soln. contg. 0.1 mol L^{-1} H_2SO_4, 0.13 mol L^{-1} 2-PrOH and $(1\text{-}100) \times 10^{-4}$ mol L^{-1} $Na_2HPW_{12}O_{40}$.	94A454
		7.6×10^9	~1			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. 2-PrOH and $HClO_4$.	82A271
16.256	**Diphosphooctadecatungstate ion(6-)**							
	$(CH_3)_2\dot{C}OH + P_2W_{18}O_{62}^{6-} \rightarrow CH_3COCH_3 + H^+ + P_2W_{18}O_{62}^{7-}$	5.7×10^9	2		295	p.r.	P.b.k. in N_2O-satd. (2.5×10^{-2} mol L^{-1}) soln. contg. 0.5 mol L^{-1} 2-PrOH and ~10^{-4} mol L^{-1} heteropolytungstophosphate.	82A107
16.257	**12-Tungstosilicate ion(4-)**							
	$(CH_3)_2\dot{C}OH + SiW_{12}O_{40}^{4-} \rightarrow CH_3COCH_3 + H^+ + SiW_{12}O_{40}^{5-}$	5.3×10^9	5-6			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. 2-PrOH.	82A271
16.258	**Zinc(I) ion**							
	$(CH_3)_2\dot{C}OH + Zn^+ + H^+ \rightarrow Zn^{2+}$ + 2-PrOH	1.3×10^9	~3,7		295	p.r.	Calcd. from d.k. at 310 nm (Zn^+) in soln. contg. 2-PrOH and $ZnSO_4$ using $k(Zn^+ + Zn^+) = 4.5 \times 10^8$ L mol^{-1} s^{-1}.	771011
16.259	**Zinc(II) ion**							
	$(CH_3)_2\dot{C}OH + Zn^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in Zn^+ in 2-PrOH.	751027
16.260	**5,10,15,20-Tetraphenylporphinatozinc(II)**							
	$(CH_3)_2\dot{C}OH$ + ZnTPP → CH_3COCH_3 + H^+ + $[ZnTPP]^{\cdot-}$	~1×10^8	7			p.r.	D.k. at ~475 nm as well as p.b.k. at ~700 nm (radical anion) in micellar soln. contg. 2% Triton X-100.	82N150

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.261	**Tetraphenylporphinatozinc(II), triplet state**							
	$(CH_3)_2\dot{C}OH + {}^3(ZnTPP)^* \rightarrow CH_3COCH_3 + H^+ + [ZnTPP]^{\cdot -}$	2.0×10^9	7			p.r.	Abs. changes in N_2O-satd. micellar soln. contg. 2% Triton X-100, 1.3 mol L^{-1} 2-PrOH and 10^{-3} mol L^{-1} phosphate buffer; 15% triplet produced by photolysis at 532 nm.	82N150
16.262	**5,10,15,20-Tetrakis-4-(*N,N,N*-trimethylammonio)phenylporphinezinc(II) ion**							
	$(CH_3)_2\dot{C}O^- + ZnTAPP^{4+} \rightarrow CH_3COCH_3 + [ZnTAPP]^{\cdot 3+}$	3.5×10^9	13			p.r.	P.b.k. (radical anion), as well as d.k., in N_2O-satd soln. contg. 2-PrOH.	81A317
	$(CH_3)_2\dot{C}OH + ZnTAPP^{4+} \rightarrow CH_3COCH_3 + H^+ + [ZnTAPP]^{\cdot 3+}$	2.4×10^8	8			p.r.	P.b.k. (radical anion), as well as d.k., in N_2O-satd. soln. contg. 2-PrOH.	81A317
16.263	**5,10,15,20-Tetrakis[1-(3-sulfonatopropyl)pyridinium-4-yl]porphinatozinc(II)**							
	$(CH_3)_2\dot{C}OH + ZnTZP \rightarrow CH_3COCH_3 + [ZnTZP]^{\cdot -} + H^+$	8.6×10^8	7			p.r.	P.b.k. in soln. contg. 0.1 mol L^{-1} 2-PrOH; slow grow-in follows fast e_{aq}^- reaction.	83C026
	$(CH_3)_2\dot{C}O^- + ZnTZP \rightarrow CH_3COCH_3 + [ZnTZP]^{\cdot -}$	1.7×10^9	12			p.r.	P.b.k. in soln. contg. 0.1 mol L^{-1} 2-PrOH; slow grow-in follows fast e_{aq}^- reaction.	83C026
16.264	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatozinc(II) ion**							
	$(CH_3)_2\dot{C}OH + ZnTMpyP^{4+} \rightarrow CH_3COCH_3 + [ZnTMpyP]^{\cdot 3+} + H^+$	2.3×10^9	7			p.r.	P.b.k. at 470 nm in N_2O-satd. soln. contg. 5×10^{-5} mol L^{-1} porphyrin, 10^{-3} mol L^{-1} phosphate buffer, and 0.3 mol L^{-1} 2-PrOH.	84A046
		2.3×10^9	8			p.r.	P.b.k. (radical anion), as well as d.k., in N_2O-satd. soln. contg. 2-PrOH.	81A317
	$(CH_3)_2\dot{C}O^- + ZnTMpyP^{4+} \rightarrow CH_3COCH_3 + [ZnTMpyP]^{\cdot 3+}$	6.7×10^9	13			p.r.	P.b.k. (radical anion), as well as d.k., in N_2O-satd. soln. contg. 2-PrOH.	81A317
16.265	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatozinc(II) ion, triplet state**							
	$(CH_3)_2\dot{C}OH + {}^3(ZnTMpyP^{4+})^* \rightarrow CH_3COCH_3 + H^+ + [ZnTMpyP]^{\cdot 3+}$	$\geq 10^{10}$	7			p.r.	D.k. (triplet) and p.b.k. (radical anion) at 470 nm in N_2O-satd. soln. contg. 5×10^{-5} mol L^{-1} porphyrin, 10^{-3} mol L^{-1} phosphate buffer, and 0.3 mol L^{-1} 2-PrOH. Triplet excited by laser pulse at 590 nm.	84A046
16.266	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion**							
	$(CH_3)_2\dot{C}O^- + ZnTPPS^{4-} \rightarrow CH_3COCH_3 + [ZnTPPS]^{\cdot 5-}$	1.0×10^9	13			p.r.	P.b.k. (radical anion), as well as d.k., in N_2O-satd. soln. contg. 2-PrOH.	81A317
	$(CH_3)_2\dot{C}OH + ZnTPPS^{4-} \rightarrow CH_3COCH_3 + H^+ + [ZnTPPS]^{\cdot 5-}$	1×10^8	7, 11-12			p.r.	P.b.k. at 450 and 690 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} 2-PrOH and 10^{-3} mol L^{-1} phosphate.	82A279
		$\sim 8 \times 10^7$	8			p.r.	P.b.k. (radical anion), as well as d.k., in N_2O-satd. soln. contg. 2-PrOH.	81A317
16.267	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion, triplet state**							
	$(CH_3)_2\dot{C}OH + {}^3(ZnTPPS^{4-})^* \rightarrow CH_3COCH_3 + H^+ + [ZnTPPS]^{\cdot 5-}$	$\sim 3 \times 10^9$	7, 11-12			p.r.	P.b.k. at 450 and 690 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} 2-PrOH and 10^{-3} mol L^{-1} phosphate buffer; ~85% of radicals react with triplet (30% of the ZnTPPS is converted to triplet by photolysis).	82A279
16.268	**Tetrakis-*N*-methyl-2,3-pyridinoporphyrazinezinc(II) ion**							
	$(CH_3)_2\dot{C}OH + ZnTMPz^{4+} \rightarrow CH_3COCH_3 + H^+ + [ZnTMPz]^{\cdot 3+}$	5.5×10^9	7			p.r.	P.b.k. at 550 nm in N_2O-satd. phosphate buffered soln. contg. 10% 2-PrOH.	86B153
16.269	**Zinc(II) hematoporphyrin**							
	$(CH_3)_2\dot{C}O^- + ZnHP \rightarrow CH_3COCH_3 + [ZnHP]^{\cdot -}$	1.0×10^9	13.0			p.r.	P.b.k. at 600-650 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	741040

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T (K)	Method	Comment	Ref.
16.270	**Acetophenone**							
	$(CH_3)_2\dot{C}O^- + C_6H_5COCH_3 \rightarrow CH_3COCH_3 + C_6H_5\dot{C}O^-CH_3$	9×10^8	13			p.r.	P.b.k. at 440 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH; pH dependent, k extrapolated to pH 14.	730122
		7.8×10^8	12			p.r.	P.b.k. at 440 nm in deaerated soln. contg. acetophenone and excess acetone.	670729
16.271	**3-Acetylpyridine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 3\text{-}pyH^+COCH_3 \rightarrow$ electron transfer	8.6×10^9	0.6			p.r.	P.b.k.; no e-transfer in neutral soln.; pK_a = 4.9.	741089
16.272	**Acridine**							
	$(CH_3)_2\dot{C}OH + Ac \rightarrow$	$\sim 3 \times 10^8$	7-9			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; 50% addn., 50% redn.	79A305
		3.0×10^8	7.6			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; ~10% e-transfer.	741127
	$(CH_3)_2\dot{C}O^- + Ac \rightarrow CH_3COCH_3 + Ac^{\bullet -}$	3×10^9	13			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	79A305
16.273	**Acridinium**							
	$(CH_3)_2\dot{C}OH + AcH^+ \rightarrow CH_3COCH_3 + H^+ + AcH^{\bullet}$	3.3×10^9	4			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	79A305
		3.7×10^9	2.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; ~90% e-transfer.	741127
16.274	**N^1-(Acridinyl)-N^4-methylsulfonyl-2-dimethylaminocyclohexa-2,5-diene-1′,4′-diimine**							
	$(CH_3)_2\dot{C}OH + diAQDI \rightarrow CH_3COCH_3 + H^+ + diAQDI^{\bullet}$	4×10^9				p.r.	Abs. changes in N_2-satd. soln. contg. 2-PrOH.	88A125
16.275	**N^1-(Acridinyl)-N^4-methylsulfonyl-2-methoxycyclohexa-2,5-diene-1′,4′-diimine**							
	$(CH_3)_2\dot{C}OH + mAQDI \rightarrow CH_3COCH_3 + H^+ + mAQDI^{\bullet}$	$\sim 3 \times 10^9$				p.r.	Abs. changes in N_2-satd. soln. contg. 2-PrOH.	88A125
16.276	**Acrylamide**							
	$(CH_3)_2\dot{C}OH + H_2C{=}CHCONH_2 \rightarrow$ addn.	4.1×10^7	2-5			p.r.	C.k. in N_2O-satd. soln. contg. 2-PrOH and Cu^{2+}; rel. to $k((CH_3)_2\dot{C}OH + Cu^{2+}) = 5.2 \times 10^7$ L mol^{-1} s^{-1}.	78A322
16.277	**Acrylate ion**							
	$(CH_3)_2\dot{C}OH + CH_2{=}CHCO_2^- \rightarrow$ addn.	3.2×10^6	~9			chem.	*Esr study in soln. contg. 1.67 × 10^{-3} mol L^{-1}* Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and 2-PrOH; calcd. using $2k(R + R) = 1.4 \times 10^9$ L mol^{-1} s^{-1}.	93D265
16.278	**Adenine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + AH_2^+ \rightarrow$ addn.	1.2×10^8	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368
16.279	**Adenosine**							
	$(CH_3)_2\dot{C}OH + AH \rightarrow$ electron transfer	4.7×10^7 $<10^6$	2.2 7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 1-2 mol L^{-1} 2-PrOH; pK_a = 3.6, 12.4.	751060
16.280	**Adenosine anion**							
	$(CH_3)_2\dot{C}O^- + A^- + H_2O \rightarrow [AH]^{\bullet -} + OH^- + CH_3COCH_3$	10^7	13		293	p.r.	P.b.k. at 355 nm in deaerated soln. contg. 0.1 mol L^{-1} 2-PrOH.	92A037
		$<10^6$	13.6			p.r.	P.b.k. in N_2O-satd. soln. contg. 1-2 mol L^{-1} 2-PrOH.	751060

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.281	**1-Amino-9,10-anthraquinone**							
	$(CH_3)_2\dot{C}OH + 1\text{-}AQ(NH_2) \rightarrow CH_3COCH_3 + H^+ + 1\text{-}AQ^{\bullet}(NH_2)^-$	3.0×10^9 3.2×10^9 2.8×10^9	2.0 8.0 12			p.r.	P.b.k. at >600 nm in N_2-satd. soln. contg. 5 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone; pK_a of semiquinone = 5.8, >14.	94A267
16.282	**4-Aminocarbonylpyridinioacetate ion**							
	$(CH_3)_2\dot{C}OH + 4\text{-}NH_2COpy^+CH_2CO_2^- \rightarrow CH_3COCH_3 + H^+ + [4\text{-}NH_2COpyCH_2CO_2]^{\bullet -}$	3.5×10^9 4.1×10^9	1 4.5-5.5		295	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	83B029
16.283	**1-Amino-4-hydroxy-9,10-anthraquinone**							
	$(CH_3)_2\dot{C}OH + 1,4\text{-}AQ(NH_2)(OH) \rightarrow [1,4\text{-}AQ(NH_2)(OH)]^{\bullet -} + CH_3COCH_3 + H^+$	1.6×10^9	8.8			p.r.	P.b.k. at >640 nm in N_2-satd. soln. soln. contg. 5 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	92A416
16.284	**2-Amino-5-nitrothiazole**							
	$(CH_3)_2\dot{C}OH + NX \rightarrow NX^{\bullet -} + CH_3COCH_3 + H^+$	2.0×10^9	~7			p.r.	P.b.k.	761075
16.285	**2-[(3-Aminopropyl)amino]ethaneperthiol, conjugate acid**							
	$(CH_3)_2\dot{C}OH + HSS(CH_2)_2NH(CH_2)_3NH_3^+ \rightarrow 2\text{-}PrOH + {}^{\bullet}SS(CH_2)_2NH(CH_2)_3NH_3^+$	2.5×10^9 $\sim 2.4 \times 10^8$	4.5 ~7		293	p.r.	P.b.k. at 374 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH, 0.001 mol L^{-1} phosphate buffer and $(0.25\text{-}1.75) \times 10^{-3}$ mol L^{-1} 2-(3-aminopropylamino)ethaneperthiol; pK_a = 6.2; basic form unreactive.	94A328 94A061
		2.3×10^9	4.5		293	p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH, 0.001 mol L^{-1} phosphate buffer, methyl viologen and 2-(3-aminopropylamino)ethaneperthiol; rel. to $k((CH_3)_2\dot{C}OH + MV^{2+}) = 2.6 \times 10^9$ L mol^{-1} s^{-1}; $k_r = 3.8 \times 10^3$ L mol^{-1} s^{-1}.	94A328
16.286	**2-[(3-Aminopropyl)amino]ethanethiol, conjugate acid**							
	$(CH_3)_2\dot{C}OH + HSCH_2CH_2NH(CH_2)_3NH_3^+ \rightarrow 2\text{-}PrOH + {}^{\bullet}S(CH_2)_2NH(CH_2)_3NH_2$	2.5×10^8	4.5, ~7		293	p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH, 0.001 mol L^{-1} phosphate buffer, methyl viologen and 2-(3-aminopropylamino)ethanethiol; $pK_a = 7.6$; basic form unreactive; rel. to $k((CH_3)_2\dot{C}OH + MV^{2+}) = 2.6 \times 10^9$ L mol^{-1} s^{-1}; $k_r = 1.4 \times 10^4$ L mol^{-1} s^{-1}.	94A328 94A061
	$(CH_3)_2\dot{C}OH + {}^{-}S(CH_2)_2NH(CH_2)_3NH_3^+ \rightarrow 2\text{-}PrOH + {}^{\bullet}S(CH_2)_2NH(CH_2)_3NH_2$	2×10^8	7			p.r.	P.b.k.; monitored formation of thiyl radicals by their reaction with $ABTS^{2-}$; $pK_a = 7.3$.	84A411
16.287	**4-Aminopyrimidine**							
	$(CH_3)_2\dot{C}OH + 4\text{-}AmPm \rightarrow$		0.8-13.0			p.r.	No e-transfer obs.	771034
16.288	**9,10-Anthraquinone**							
	$(CH_3)_2\dot{C}OH + AQ \rightarrow CH_3COCH_3 + H^+ + [AQ]^{\bullet -}$	2.7×10^9 1.8×10^9 1.6×10^9	2.0 8.0 12			p.r.	P.b.k. at >600 nm in N_2-satd. soln. contg. 5 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone; pK_a of semiquinone = 4.4.	94A267
		1.6×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	731104
16.289	**9,10-Anthraquinone-2,6-disulfonate ion**							
	$(CH_3)_2\dot{C}OH + 2,6\text{-}diSO_3AQ^{2-} \rightarrow CH_3COCH_3 + H^+ + [2,6\text{-}diSO_3AQ]^{\bullet 3-}$	4.6×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	731104
16.290	**9,10-Anthraquinone-2-sulfonate ion**							
	$(CH_3)_2\dot{C}OH + 2\text{-}SO_3AQ^- \rightarrow [2\text{-}SO_3AQ]^{\bullet 2-} + CH_3COCH_3 + H^+$	3.1×10^9	acid			p.r.	P.b.k. at 400 nm in soln. contg. 2-PrOH.	87A083

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.290	**9,10-Anthraquinone-2-sulfonate ion** — Continued							
		3×10^9	7.2			p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} 2-PrOH, (0.005-0.01) mol L^{-1} acetone and 6 mg L^{-1} catalase.	82A156
		5.6×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761070
		3.0×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	731104
16.291	**Ascorbate ion**							
	$(CH_3)_2\dot{C}OH + AH^- \rightarrow A^{\cdot -} + 2\text{-PrOH}$	7.4×10^5	>5.5		289	f.p.	D.k. (esr) in soln. contg. 2,4-dihydroxy-2,4-dimethylpentan-3-one and ascorbic acid; studied at pH 1.0-7.3.	90A514
		1.2×10^6	6.1			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} acetone. and 2 mol L^{-1} 2-PrOH.	733006
16.292	**Ascorbic acid**							
	$(CH_3)_2\dot{C}OH + AH_2 \rightarrow AH^{\cdot} + 2\text{-PrOH}$	3.8×10^4	<2.2		289	f.p.	D.k. (esr) in soln. contg. 2,4-dihydroxy-2,4-dimethylpentan-3-one and ascorbic acid; studied at pH 1.0-7.3.	90A514
16.293	**Ascorbate radical anion**							
	$(CH_3)_2\dot{C}OH + A^{\cdot -} \rightarrow$	4.5×10^8			289	f.p.	D.k. (esr) in soln. contg. 2,4-dihydroxy-2,4-dimethylpentan-3-one and ascorbic acid; studied at pH 1.0-7.3	90A514
16.294	**Azobenzene**							
	$(CH_3)_2\dot{C}O^- + C_6H_5N{=}NC_6H_5 \rightarrow CH_3COCH_3 + [C_6H_5N{=}NC_6H_5]^{\cdot -}$	2×10^9	14			p.r.	P.b.k. at 380 nm in soln. contg. 2-PrOH; *anti*-isomer.	771169
	$(CH_3)_2\dot{C}OH + C_6H_5N{=}NC_6H_5 \rightarrow CH_3COCH_3 + H^+ + [C_6H_5N{=}NC_6H_5]^{\cdot -}$	4×10^8	~7			p.r.	P.b.k. at 380 nm in soln. contg. 2-PrOH; *anti*-isomer.	771169
16.295	**1,1'-Azobis(*N,N*-dimethylformamide)**							
	$(CH_3)_2\dot{C}OH + (CH_3)_2NCON{=}NCON(CH_3)_2 \rightarrow [(CH_3)_2NCONNCON(CH_3)_2]^{\cdot -} + H^+ + CH_3COCH_3$	$\sim 2.5 \times 10^9$			293	p.r.	P.b.k. at 400 nm.	751194
16.296	**Benzophenone**							
	$(CH_3)_2\dot{C}O^- + (C_6H_5)_2CO \rightarrow CH_3COCH_3 + (C_6H_5)_2\dot{C}O^-$	7.0×10^8	13			p.r.	P.b.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH.	751125
		1.6×10^9	13.1			p.r.	P.b.k. at 605 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
		1.2×10^9	12			p.r.	P.b.k.	680308
16.297	**1,4-Benzoquinone**							
	$(CH_3)_2\dot{C}OH + Q \rightarrow CH_3COCH_3 + H^+ + Q^{\cdot -}$	3.1×10^9				γ-r.	C.k. in soln. contg. 1 mol L^{-1} H_2SO_4, 1.5×10^{-4} mol L^{-1} benzoquinone and 2-PrOH with varied [O_2]; rel. to $k((CH_3)_2\dot{C}OH + O_2) = 4.2 \times 10^9$ L mol^{-1} s^{-1}.	86G034
		5×10^9	6.9			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	730049
		5.0×10^9	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} acetone and 1 mol L^{-1} 2-PrOH.	730125
		5.4×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	731104
		5.0×10^9				p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	710619

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.298	**2,1,3-Benzothiadiazole-4,7-dicarbonitrile**							
	$(CH_3)_2\dot{C}OH + BTDN \rightarrow CH_3COCH_3 + H^+ + [BTDN]^{\cdot -}$	3.1×10^9				p.r.	P.b.k. at 500 nm.	86A098
16.299	**3-Benzoyl-1-methylpyridinium**							
	$(CH_3)_2\dot{C}OH + 3\text{-}C_6H_5COpy^+CH_3 \rightarrow CH_3COCH_3 + 3\text{-}pyCH_3^+\dot{C}(O^-)C_6H_5 + H^+$	2.3×10^9	5.0, 1.0			p.r.	P.b.k. at 530 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
16.300	**2-Benzoylpyridine**							
	$(CH_3)_2\dot{C}OH + 2\text{-}C_6H_5COpy \rightarrow CH_3COCH_3 + 2\text{-}py\dot{C}(O^-)C_6H_5 + H^+$	1.5×10^8	5.9			p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
	$(CH_3)_2\dot{C}O^- + 2\text{-}C_6H_5COpy \rightarrow CH_3COCH_3 + 2\text{-}py\dot{C}(O^-)C_6H_5$	2.3×10^9	13.2			p.r.	P.b.k. at 550 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
16.301	**2-Benzoylpyridine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 2\text{-}C_6H_5COpyH^+ \rightarrow CH_3COCH_3 + 2\text{-}py\dot{C}(OH)C_6H_5 + H^+$	3.0×10^9	1.0			p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
16.302	**3-Benzoylpyridine**							
	$(CH_3)_2\dot{C}O^- + 3\text{-}C_6H_5COpy \rightarrow CH_3COCH_3 + 3\text{-}py\dot{C}(O^-)C_6H_5$	2.0×10^9	13.0			p.r.	P.b.k. at 605 nm, as well as at 341 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
	$(CH_3)_2\dot{C}OH + 3\text{-}C_6H_5COpy \rightarrow CH_3COCH_3 + 3\text{-}py\dot{C}(O^-)C_6H_5 + H^+$	1.0×10^8	5.1			p.r.	P.b.k. at 530 nm, as well as at 330 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
16.303	**3-Benzoylpyridine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 3\text{-}C_6H_5COpyH^+ \rightarrow CH_3COCH_3 + 3\text{-}py\dot{C}(OH)C_6H_5 + H^+$	2.3×10^9 1.7×10^9	0.5 0.9			p.r.	P.b.k. at 500 nm, as well as at 330 nm, in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
16.304	**4-Benzoylpyridine**							
	$(CH_3)_2\dot{C}OH + 4\text{-}C_6H_5COpy \rightarrow CH_3COCH_3 + 4\text{-}py\dot{C}(O^-)C_6H_5 + H^+$	2.4×10^8	7.7			p.r.	P.b.k. at 500 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
	$(CH_3)_2\dot{C}O^- + 4\text{-}C_6H_5COpy \rightarrow CH_3COCH_3 + 4\text{-}py\dot{C}(O^-)C_6H_5$	2.5×10^9	13.2			p.r.	P.b.k. at 575 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
16.305	**4-Benzoylpyridine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 4\text{-}C_6H_5COpyH^+ \rightarrow CH_3COCH_3 + 4\text{-}py\dot{C}(OH)C_6H_5 + H^+$	2.5×10^9	0.7			p.r.	P.b.k. at 510 nm in N_2O-satd. soln. contg. 2 mol L^{-1} 2-PrOH.	720359
16.306	**Biacetyl**							
	$(CH_3)_2\dot{C}OH + CH_3COCOCH_3 \rightarrow CH_3COCH_3 + H^+ + [CH_3COCOCH_3]^{\cdot -}$	6.0×10^8	5-6			p.r.	D.k. in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} 2-PrOH.	72A018
		8.6×10^8				p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} 2-PrOH.	680249
16.307	**Bianthrone**							
	$(CH_3)_2\dot{C}OH + BA \rightarrow CH_3COCH_3 + [BA]^{\cdot -} + H^+$	$\sim 3 \times 10^8$	12		294	p.r.	P.b.k. in N_2-satd. 2-PrOH soln. contg. 20% water, 10% dioxane and 0.2% acetone; two-step reaction cannot be determined accurately.	81A313
16.308	**2,2′-Bipyridine**							
	$(CH_3)_2\dot{C}O^- + bpy + H^+ \rightarrow CH_3COCH_3 + bpyH^{\cdot}$	1.3×10^8	13.0			p.r.	P.b.k. at 365 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH and 0.1 mol L^{-1} acetone.	79A148
	$(CH_3)_2\dot{C}OH + bpy \rightarrow$	$<10^6$	7			p.r.	P.b.k.; no reaction obs.	79A148
16.309	**2,2′-Bipyridine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + bpyH^+ \rightarrow CH_3COCH_3 + [bpyH_2]^{\cdot +}$	3.5×10^8	1.4, 3.7			p.r.	P.b.k. at 375 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	79A148

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.310	**4,4′-Bipyridine, conjugate diacid**							
	$(CH_3)_2\dot{C}OH + 4,4'\text{-}bpyH_2^{2+} \rightarrow CH_3COCH_3 + H^+ + [4,4'\text{-}bpyH_2]^{\cdot+}$	3.2×10^9	1			p.r.	P.b.k. at 375 and 580 nm in soln. contg. 0.1-0.2 mol L^{-1} 2-PrOH, 0.1 mol L^{-1} $HClO_4$ and $(2\text{-}6) \times 10^{-4}$ mol L^{-1} 4,4′-$bpyH_2^{2+}$.	84A325
16.311	**(*E*)-1,2-Bis(4-pyridyl)ethene, conjugate diacid**							
	$(CH_3)_2\dot{C}OH + 4\text{-}pyH^+CH{=}CH\text{-}4\text{-}pyH^+ \rightarrow [4\text{-}pyHCH{=}CH\text{-}4\text{-}pyH]^{\cdot+} + CH_3COCH_3 + H^+$	$\sim 2 \times 10^8$	3			p.r.	P.b.k. at 500 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	91B043
16.312	**1,1′-Bis(3-sulfonatopropyl)-4,4′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + SPV \rightarrow SPV^{\cdot-} + CH_3COCH_3 + H^+$	3.5×10^9	2.0			p.r.	P.b.k. at 578 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	87N002
16.313	**1-Bromo-1-chloro-2,2,2-trifluoroethane**							
	$(CH_3)_2\dot{C}OH + CF_3CHClBr \rightarrow CH_3COCH_3 + CF_3\dot{C}HCl + Br^- + H^+$	7.6×10^7				p.r.	C.k. in soln. contg. 10% 2-PrOH and 10% acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	83A195
		5×10^7	~3			p.r.	C.k. in N_2O-satd. soln. contg. 50% 2-PrOH and 1.2×10^{-3} mol L^{-1} $HClO_4$; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 1.8 \times 10^9$ L mol^{-1} s^{-1}.	82A222
	$(CH_3)_2\dot{C}O^- + CF_3CHClBr \rightarrow CH_3COCH_3 + CF_3\dot{C}HCl + Br^-$	5.8×10^8	~13			p.r.	C.k. in N_2-satd. soln. contg. 50% 2-PrOH, 0.68 mol L^{-1} acetone and 0.05 mol L^{-1} NaOH; rel. to $k((CH_3)_2\dot{C}O^- + PNAP) = 2.1 \times 10^9$ L mol^{-1} s^{-1}.	82A222
16.314	**6-Bromo-6-deoxyascorbate ion**							
	$(CH_3)_2\dot{C}OH + 6\text{-}Br\text{-}AH^- \rightarrow CH_3COCH_3 + H^+ + Br^- + 6\text{-}\dot{C}H_2\text{-}AH^-$	2.2×10^7	6			p.r.	C.k. in N_2O-satd. soln. contg. 10% 2-PrOH, varied [PNAP] and 1×10^{-3} mol L^{-1} 6-bromo-6-deoxyascorbate ion; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.0 \times 10^9$ L mol^{-1} s^{-1};	94A329
16.315	**2-Bromo-5-nitrothiazole**							
	$(CH_3)_2\dot{C}OH + NTh \rightarrow [NTh]^{\cdot-} + CH_3COCH_3 + H^+$	3.0×10^9				p.r.	P.b.k.	761075
16.316	***N*-Bromosuccinimide**							
	$(CH_3)_2\dot{C}OH + SBr \rightarrow$	2.2×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH, *N*-bromosuccinimide and bromide ion; buildup of $Br_2^{\cdot-}$ as monitor.	91A162
16.317	**Bromotrifluoromethane**							
	$(CH_3)_2\dot{C}O^- + CF_3Br \rightarrow {}^{\cdot}CF_3 + Br^- + CH_3COCH_3$	$\sim 3 \times 10^8$	13			p.r.	C.k. in deoxygenated soln., satd. with CF_3Br (4×10^{-3} mol L^{-1}) and contg. 5×10^{-4} mol L^{-1} PNAP and 2-PrOH; rel. to $k((CH_3)_2\dot{C}O^- + PNAP) = 2.2 \times 10^9$ L mol^{-1} s^{-1}.	87A480
16.318	**5-Bromouracil**							
	$(CH_3)_2\dot{C}OH + 5\text{-}BrU \rightarrow$	2×10^7				p.r.	C.k.; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	731140
16.319	**Carbon tetrachloride**							
	$(CH_3)_2\dot{C}OH + CCl_4 \rightarrow {}^{\cdot}CCl_3 + Cl^- + CH_3COCH_3 + H^+$	7×10^8				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	731140
		1.0×10^8				p.r.	Condy.; build-up of HCl in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	710778

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.320	**3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy**							
	$(CH_3)_2\dot{C}OH$ + NX-s → electron transfer	3.3×10^8	acid			p.r.	Condy.; N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761152
16.321	**3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy**							
	$(CH_3)_2\dot{C}OH$ + NX-u → electron transfer	3.6×10^8	acid			p.r.	Condy.; N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761152
16.322	**1-Carboxymethylimidazolium**							
	$(CH_3)_2\dot{C}OH + 1\text{-}HO_2CCH_2ImH^+ \rightarrow CH_3COCH_3 + H^+ + [1\text{-}HO_2CCH_2ImH]^{\bullet}$	7.3×10^4	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.323	**Carboxymethyl 4-pyridinecarboxylate, anion**							
	$(CH_3)_2\dot{C}OH + 4\text{-}pyCO_2CH_2CO_2^- \rightarrow CH_3COCH_3 + [4\text{-}pyHCO_2CH_2CO_2]^{\bullet -}$	2.6×10^9 1.3×10^9	1 4.5-5.5		295	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	83B029
16.324	**3-Carboxy-1-methylpyridinium**							
	$(CH_3)_2\dot{C}OH + 3\text{-}py^+(CH_3)CO_2^- \rightarrow CH_3COCH_3 + H^+ + 3\text{-}py^{\bullet}(CH_3)CO_2^-$	1.0×10^8	9.2			p.r.	P.b.k. (pyridinyl radical) at 400 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.325	**4-Carboxy-1-methylpyridinium**							
	$(CH_3)_2\dot{C}OH + 4\text{-}py^+(CH_3)CO_2^- \rightarrow CH_3COCH_3 + H^+ + 4\text{-}py^{\bullet}(CH_3)CO_2^-$	1.5×10^9	8.6			p.r.	P.b.k. at 400 nm in N_2O-satd. soln contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.326	**Chloral hydrate**							
	$(CH_3)_2\dot{C}OH + CCl_3CH(OH)_2 \rightarrow$	1×10^6				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	731140
16.327	**3-Chlorobenzonitrile**							
	$(CH_3)_2\dot{C}O^- + 3\text{-}ClC_6H_4CN \rightarrow CH_3COCH_3 + [3\text{-}ClC_6H_4CN]^{\bullet -}$	2×10^8	13			p.r.	P.b.k. at 310 nm (radical anion); $k < 10^7$ L mol^{-1} s^{-1} at pH 7.	81A001
16.328	**Chloroform**							
	$(CH_3)_2\dot{C}OH + CHCl_3 \rightarrow$	$<1 \times 10^7$				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	731140
16.329	**1-Chloro-2-nitrobenzene**							
	$(CH_3)_2\dot{C}OH + 2\text{-}ClC_6H_4NO_2 \rightarrow 2\text{-}ClC_6H_4NO_2\text{-}COH(CH_3)_3$	1.2×10^9				p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	92A414
16.330	**3-Chloropyridinium**							
	$(CH_3)_2\dot{C}OH + 3\text{-}ClC_5H_4NH^+ \rightarrow CH_3COCH_3 + H^+ + 3\text{-}ClC_5H_4NH^{\bullet}$	7.4×10^7		1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$ and 0.1 mol L^{-1} $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A209
16.331	**4-Chloropyridinium**							
	$(CH_3)_2\dot{C}OH + 4\text{-}ClC_5H_4NH^+ \rightarrow CH_3COCH_3 + H^+ + 4\text{-}ClC_5H_4NH^{\bullet}$	2.6×10^6		1.0	298	chem.	D.k. in soln. contg. $\sim 2 \times 10^{-5}$ mol L^{-1} $CrC(CH_3)_2OH^{2+}$ and 0.1 mol L^{-1} $HClO_4$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	86A209

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.332	**Crotonic acid**							
	$(CH_3)_2\dot{C}OH + CH_3CH{=}CHCO_2H \rightarrow$ addn.	2.0×10^6	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and 2-PrOH; calcd. using $2k(R + R) = 1.4 \times 10^9$ L $mol^{-1}\ s^{-1}$.	93D265
16.333	**Crystal Violet cation**							
	$(CH_3)_2\dot{C}OH + CV^+ \rightarrow$	2.3×10^9	7			p.r.	D.k. at 525 nm in N_2O-satd. soln. contg. 2-PrOH; 84% *e*-transfer.	731078
16.334	**Cysteamine**							
	$(CH_3)_2\dot{C}OH + H_3N^+CH_2CH_2S^- \rightarrow$ 2-PrOH + $H_2NCH_2CH_2S^\bullet$	3.8×10^8	4.2			p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. 1 mol L^{-1} acetone, 1 mol L^{-1} 2-PrOH, *cysteamine and* $ABTS^{2-}$; *the latter reacts* with $RS^\bullet$ to form $ABTS^{\bullet-}$ which is observed.	82A196
		2.0×10^8	7			p.r.	D.k. in N_2O-satd. soln. contg. 2-PrOH; esr gating technique.	723003
		4.2×10^8				p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. 2-PrOH.	680132
16.335	**Cysteine**							
	$(CH_3)_2\dot{C}OH + CysSH \rightarrow$	1.9×10^8				p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. 2-PrOH, cysteine and $ABTS^{2-}$; the latter reacts with $RS^\bullet$ to give $ABTS^{\bullet-}$ which is observed.	82Z335
16.336	**5-Deazalumiflavin, protonated**							
	$(CH_3)_2\dot{C}OH$ + 5-DeLFH$^+ \rightarrow$ $CH_3COCH_3 + H^+ +$ 5-DeLFH$^\bullet$	3.0×10^9	0			p.r.	*P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1}* 2-PrOH.	*89A097*
16.337	**5-Deazalumiflavin**							
	$(CH_3)_2\dot{C}OH$ + 5-DeLF $\rightarrow$ CH_3COCH_3 + H^+ + 5-DeLF$^{\bullet-}$	3.4×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	89A097
16.338	**5-Deazalumiflavin anion**							
	$(CH_3)_2\dot{C}O^-$ + 5-DeLF(-H)$^- \rightarrow$ CH_3COCH_3 + 5-DeLF(-H)$^{\bullet 2-}$	1.6×10^9	13			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	89A097
16.339	**2′-Deoxyadenosine, conjugate acid**							
	$(CH_3)_2\dot{C}OH$ + dAH$^+ \rightarrow$ addn.	1.3×10^8	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368
16.340	**2′-Deoxyguanosine, conjugate acid**							
	$(CH_3)_2\dot{C}OH$ + dGH$^+ \rightarrow$ addn.	7.1×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368
16.341	**Deuteroporphyrin, dimethyl ester**							
	$(CH_3)_2\dot{C}O^-$ + DPDME $\rightarrow$ CH_3COCH_3 + DPDME$^{\bullet-}$	8×10^8	alk.			p.r.	Abs. changes in soln. contg. 0.67 mol L^{-1} acetone and 50% 2-PrOH.	84A345
		6×10^8	~13			p.r.	P.b.k. at 640 nm in N_2-satd. soln. contg. 50% 2-PrOH, 0.7 mol L^{-1} acetone and 0.1 mol L^{-1} NaOH.	81A123
16.342	**1,4-Diamino-9,10-anthraquinone**							
	$(CH_3)_2\dot{C}OH$ + 1,4-AQ$(NH_2)_2$ + $H^+ \rightarrow$ [1,4-AQ$(NH_2)_2$]$^{\bullet-}$ + CH_3COCH_3	9.0×10^8	5.5			p.r.	P.b.k. at >640 nm in N_2-satd. soln. soln. contg. 5 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	92A416

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.343	**1,6-Diazabicyclo[4.4.4]tetradecane radical cation**							
	$(CH_3)_2\dot{C}OH + DABCT^{\bullet+} \rightarrow$	1.1×10^9	~4			p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol 2-PrOH and $0.2\text{-}12 \times 10^{-4}$ mol L^{-1} radical cation; 40% redn., 60% H abstr.; product analysis supported by condy. measurements.	86A272
16.344	**9-Diazofluorene**							
	$(CH_3)_2\dot{C}OH + FlN_2 \rightarrow CH_3COCH_3 + H^+ + FlN_2^{\bullet-}$	4.6×10^8	~7			p.r.	P.b.k. at 510 nm in N_2-satd. soln. contg. 2.5×10^{-3} mol L^{-1} 9-diazofluorene, 34% 2-PrOH and 16% acetone.	84A266 83A152
	$(CH_3)_2\dot{C}O^- + FlN_2 \rightarrow CH_3COCH_3 + FlN_2^{\bullet-}$	6.1×10^9	11.5-13			p.r.	P.b.k. at 510 nm in N_2-satd. soln. contg. 2.5×10^{-3} mol L^{-1} 9-diazofluorene, 34% 2-PrOH and 16% acetone.	84A266 83A152
16.345	**1,1′-Dibenzyl-4,4′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + BV^{2+} \rightarrow CH_3COCH_3 + H^+ + BV^{\bullet+}$	3.0×10^9	7			p.r.	P.b.k. at 400 or 600 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	761070
16.346	**3,5-Dibromo-4-nitrosobenzenesulfonate ion**							
	$(CH_3)_2\dot{C}OH + DBNBS \rightarrow$	4.8×10^7	8.0-8.5			p.r.	C.k.; rel. to $k((CH_3)_2\dot{C}OH + H_2TPPS^{4-}) = 5.0 \times 10^7$ L $mol^{-1}\ s^{-1}$.	92A304
16.347	**4,5-Dichloroimidazolium**							
	$(CH_3)_2\dot{C}OH + 4,5\text{-}Cl_2ImH^+ \rightarrow CH_3COCH_3 + H^+ + [4,5\text{-}Cl_2ImH]^{\bullet}$	3.3×10^6	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.348	**2,6-Dichloroindophenolate ion**							
	$(CH_3)_2\dot{C}OH + DCIP^- \rightarrow$	4.4×10^9	7			p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. 2-PrOH; 88% e-transfer.	731078
16.349	**Dichloromethane**							
	$(CH_3)_2\dot{C}OH + CH_2Cl_2 \rightarrow {}^{\bullet}CH_2Cl + CH_3COCH_3 + H^+ + Cl^-$	$\sim 10^6$	7.2			p.r.	Estd. from rate of subsequent reaction of ${}^{\bullet}CHCl_2$ with deuteroheme.	80A011
						γ-r.	No redn. in soln. contg. 1.5×10^{-3} mol L^{-1} Na dodecyl sulfate, 0.2 mol L^{-1} 2-PrOH and 0.1 mol L^{-1} acetone.	79G191
16.350	**1,4-Dicyanobenzene**							
	$(CH_3)_2\dot{C}OH + DCNB \rightarrow CH_3COCH_3 + H^+ + [DCNB]^{\bullet-}$	3.9×10^8	~7			p.r.	P.b.k. at 345 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	91A229
16.351	***N,N′*-Diethylthiourea**							
	$(CH_3)_2\dot{C}OH + C_2H_5NHCSNHC_2H_5 \rightarrow$	3.5×10^8	<0			p.r.	P.b.k. at 425 nm in soln. contg. 3.6 mol L^{-1} H_2SO_4 and 1 mol L^{-1} 2-PrOH. Mechanism suggested to be protonation at S and H abstr. from NH.	94A284
16.352	**1,4-Dihydroxy-9,10-anthraquinone**							
	$(CH_3)_2\dot{C}OH + 1,4\text{-}AQ(OH)_2 \rightarrow CH_3COCH_3 + H^+ + [1,4\text{-}AQ(OH)_2]^{\bullet-}$	3.3×10^9	1.2, 5.45			p.r.	P.b.k. in soln. contg. 5 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	90A156
16.353	**1,4-Dihydroxy-9,10-anthraquinone, monoanion**							
	$(CH_3)_2\dot{C}OH + 1,4\text{-}AQ(OH)(O^-) \rightarrow CH_3COCH_3 + [1,4\text{-}AQ(OH)_2]^{\bullet-}$	1.5×10^9	10.45			p.r.	P.b.k. in soln. contg. 5 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	90A156
16.354	**1,4-Dihydroxy-9,10-anthraquinone dianion**							
	$(CH_3)_2\dot{C}O^- + 1,4\text{-}AQ(O^-)_2 \rightarrow CH_3COCH_3 + [1,4\text{-}AQ(OH)_2]^{\bullet-}$	1.8×10^9	~14			p.r.	P.b.k. in soln. contg. 5 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	90A156

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.355	**(*E*)-4,5-Dihydroxy-1,2-dithiane**							
	$(CH_3)_2\dot{C}O^- + \boxed{SSCH_2(CHOH)_2CH_2} \rightarrow CH_3COCH_3 + \boxed{\dot{S}^-SCH_2(CHOH)_2CH_2}$	1.9×10^8 4.0×10^8 7.0×10^8	13.1		273 298 333	p.r.	P.b.k. at 390 nm in soln. contg. (1-10) $\times 10^{-4}$ mol L^{-1} DTT-ox, 0.2 mol L^{-1} acetone and 0.1-0.5 mol L^{-1} 2-PrOH; mechanism suggested to be addn. followed by decomp. to radical anion.	89A167
	$(CH_3)_2\dot{C}OH + \boxed{SSCH_2(CHOH)_2CH_2} \rightarrow CH_3COCH_3 + H^+ + \boxed{\dot{S}^-SCH_2(CHOH)_2CH_2}$	2×10^7	10.8			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	86A363
16.356	**1,3-Dihydroxy-2-nitrobenzene**							
	$(CH_3)_2\dot{C}OH + 2\text{-}NO_2C_6H_3\text{-}1,3\text{-}(OH)_2 \rightarrow CH_3COCH_3 + H^+ + [1,3\text{-}(HO)_2C_6H_3\text{-}2\text{-}NO_2]^{\bullet-}$	6.8×10^8	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.357	**3,3-Dimethylacrylic acid**							
	$(CH_3)_2\dot{C}OH + (CH_3)_2C{=}CHCO_2H \rightarrow$ addn.	1×10^4	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and 2-PrOH; calcd. using $2k(R + R) = 1.4\times10^9$ L $mol^{-1}\ s^{-1}$.	93D265
16.358	**2,3-Dimethyl-1,4-benzoquinone**							
	$(CH_3)_2\dot{C}OH + 2,3\text{-}(CH_3)_2Q \rightarrow CH_3COCH_3 + H^+ + 2,3\text{-}(CH_3)_2Q^{\bullet-}$	3.5×10^9	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	730125
16.359	**2,5-Dimethyl-1,4-benzoquinone**							
	$(CH_3)_2\dot{C}OH + 2,5\text{-}(CH_3)_2Q \rightarrow CH_3COCH_3 + H^+ + 2,5\text{-}(CH_3)_2Q^{\bullet-}$	3.9×10^9	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	730125
16.360	**2,6-Dimethyl-1,4-benzoquinone**							
	$(CH_3)_2\dot{C}OH + 2,6\text{-}(CH_3)_2Q \rightarrow (CH_3)_2\dot{C}OH + H^+ + 2,6\text{-}(CH_3)_2Q^{\bullet-}$	4.2×10^9				p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	730125
16.361	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + MV^{2+} \rightarrow CH_3COCH_3 + MV^{\bullet+} + H^+$	2.6×10^9	4.5		293	p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. 5% 2-PrOH. 0.001 mol L^{-1} phosphate buffer and methyl viologen.	94A328
		2.1×10^9	4.5		293	p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. 50% 2-PrOH, 0.001 mol L^{-1} phosphate buffer and methyl viologen.	94A328
		3.4×10^9	7			p.r.	P.b.k. at 605 nm in deaerated soln. contg. 2-PrOH.	88N031
		2.9×10^9	1, nat.			p.r.	P.b.k. at 605 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH (plus 0.1 mol L^{-1} acetone at nat. pH).	84A009
		2.9×10^9	1			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	84A053
		3.5×10^9	7			p.r.	P.b.k. at 605 nm in deaerated soln. contg. 10^{-4} mol L^{-1} MV^{2+}, 1% acetone and 1% 2-propanol, and 1.2×10^{-2} mol L^{-1} poly(vinyl alcohol); slower process following e_{aq}^- reaction.	81N004
	$(CH_3)_2\dot{C}O^- + MV^{2+} \rightarrow CH_3COCH_3 + MV^{\bullet+}$	6.7×10^9	13			p.r.	P.b.k. at 605 nm in soln. congt. 0.1 mol L^{-1} each of 2-ProH and acetone	84A009
16.362	**Dimethyl fumarate**							
	$(CH_3)_2\dot{C}OH +$ *trans*-$CH_3O_2CCH{=}CHCO_2CH_3 \rightarrow$	4.0×10^9	7.0			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH; 12% *e*-transfer.	730097

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.363	**2,3-Dimethyl-1,4-naphthoquinone**							
	$(CH_3)_2\dot{C}OH + 2,3\text{-}(CH_3)_2NQ \rightarrow CH_3COCH_3 + H^+ + 2,3\text{-}(CH_3)_2NQ^{\cdot-}$	3.9×10^9	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	730125
16.364	***N,N*-Dimethyl-4-nitrosoaniline**							
	$(CH_3)_2\dot{C}OH + 4\text{-}Me_2NC_6H_4NO \rightarrow$	3.2×10^9	7			p.r.	D.k. at 440 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	690156
16.365	**1,2-Dimethyl-3-phenylisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + 1,2\text{-DMPI} \rightarrow [1,2\text{-DMPI}]^{\cdot-} + CH_3COCH_3 + H^+$	2.3×10^9	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L^{-1} 2-PrOH.	84R027
16.366	**2,5-Dimethyl-3-phenylisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + 2,5\text{-DMPI} \rightarrow [2,5\text{-DMPI}]^{\cdot-} + CH_3COCH_3 + H^+$	$\sim 2.4 \times 10^9$				p.r.	P.b.k. at 500 nm in deaerated soln. contg. 1 mol L^{-1} 2-PrOH.	82A329
16.367	**5,6-Dimethyl-3-phenyl-1,2-trimethyleneisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + DMPTI \rightarrow [DMPTI]^{\cdot-} + CH_3COCH_3 + H^+$	2.3×10^9	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L^{-1} 2-PrOH.	84R027
16.368	**1,4-Dimethylpyridinium**							
	$(CH_3)_2\dot{C}OH + (CH_3)_2py^+ \rightarrow$	$\leq 1 \times 10^4$	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.0104-0.0979 mol L^{-1} H^+ and $(8.92\text{-}18.0) \times 10^{-3}$ mol L^{-1} 1,4-dimethylpyridinium iodide; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.127 s^{-1}.	83A421
16.369	**5,5-Dimethyl-1-pyrroline-1-oxyl**							
	$(CH_3)_2\dot{C}OH + DMPO \rightarrow DMPO\text{-}COH(CH_3)_2$	1.5×10^8	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	84A426
16.370	**4,4′-Dimethyl-1,1′-tetramethylene-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + BP^{2+} \rightarrow BP^{\cdot+} + CH_3COCH_3 + H^+$	2.6×10^9	7.0			p.r.	P.b.k. at ~380 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} viologen.	84A292
16.371	**4,4′-Dimethyl-1,1′-trimethylene-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + BP^{2+} \rightarrow BP^{\cdot+} + CH_3COCH_3 + H^+$	3.2×10^9	7.0			p.r.	P.b.k. at ~380 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} viologen.	84A292
16.372	**1,5-Dimethyl-2,3-trimethyleneisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + 1,5\text{-DMTI} \rightarrow [1,5\text{-DMTI}]^{\cdot-} + CH_3COCH_3 + H^+$	$\sim 2.4 \times 10^9$				p.r.	P.b.k. at 500 nm in deaerated soln. contg. 1 mol L^{-1} 2-PrOH.	82A329
16.373	**3,5-Dinitroanisole**							
	$(CH_3)_2\dot{C}OH + 3,5\text{-}(NO_2)_2C_6H_3OCH_3 \rightarrow CH_3COCH_3 + H^+ + [3,5\text{-}(NO_2)_2C_6H_3OCH_3]^{\cdot-}$	2.5×10^9	7			p.r.	P.b.k. at 310 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH; reaction observed as a slower process following fast e_{aq}^- reaction.	79A176
16.374	**1,2-Dinitrobenzene**							
	$(CH_3)_2\dot{C}OH + 1,2\text{-}C_6H_4(NO_2)_2 \rightarrow CH_3COCH_3 + H^+ + [1,2\text{-}C_6H_4(NO_2)_2]^{\cdot-}$	2.9×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20-30%.	761111
16.375	**1,3-Dinitrobenzene**							
	$(CH_3)_2\dot{C}OH + 1,3\text{-}C_6H_4(NO_2)_2 \rightarrow CH_3COCH_3 + H^+ + [1,3\text{-}C_6H_4(NO_2)_2]^{\cdot-}$	3.6×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20-30%.	761111

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.376	**1,4-Dinitrobenzene**							
	$(CH_3)_2\dot{C}OH + 1,4\text{-}C_6H_4(NO_2)_2 \rightarrow CH_3COCH_3 + H^+ + [1,4\text{-}C_6H_4(NO_2)_2]^{\cdot -}$	3.2×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
		3.2×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20-30%.	761111
16.377	**2,4-Dinitrobenzoate ion**							
	$(CH_3)_2\dot{C}OH + 2,4\text{-}(NO_2)_2C_6H_3CO_2^- \rightarrow CH_3COCH_3 + H^+ + [2,4\text{-}(NO_2)_2C_6H_3CO_2]^{\cdot 2-}$	2.9×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20-30%.	761111
16.378	**2,5-Dinitrobenzoate ion**							
	$(CH_3)_2\dot{C}OH + 2,5\text{-}(NO_2)_2C_6H_3CO_2^- \rightarrow CH_3COCH_3 + H^+ + [2,5\text{-}(NO_2)_2C_6H_3CO_2]^{\cdot 2-}$	3.3×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20-30%.	761111
16.379	**3,4-Dinitrobenzoate ion**							
	$(CH_3)_2\dot{C}OH + 3,4\text{-}(NO_2)_2C_6H_3CO_2^- \rightarrow CH_3COCH_3 + H^+ + [3,4\text{-}(NO_2)_2C_6H_3CO_2]^{\cdot 2-}$	3.2×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20-30%.	761111
16.380	**3,5-Dinitrobenzoate ion**							
	$(CH_3)_2\dot{C}OH + 3,5\text{-}(NO_2)_2C_6H_3CO_2^- \rightarrow CH_3COCH_3 + H^+ + [3,5\text{-}(NO_2)_2C_6H_3CO_2]^{\cdot 2-}$	3.1×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20-30%.	761111
16.381	**Diphenyliodonium**							
	$(CH_3)_2\dot{C}OH + (C_6H_5)_2I^+ \rightarrow (C_6H_5)_2I^{\cdot} + CH_3COCH_3 + H^+$	6×10^7				p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. $(4\text{-}15) \times 10^{-3}$ mol L^{-1} Ph_2IPF_6 and 1.12 mol L^{-1} 2-PrOH.	87A437
16.382	**1,2-Dithiolane-3-pentanoate ion (Lipoate ion)**							
	$(CH_3)_2\dot{C}OH + RSSR \rightarrow RSSR^{\cdot -} + CH_3COCH_3 + H^+$	1.8×10^8	7			p.r.	P.b.k. at 410 nm in soln. contg. 1 mol L^{-1} acetone and 2-PrOH.	700560
16.383	**Dithiothreitol**							
	$(CH_3)_2\dot{C}OH + HSCH_2(CHOH)_2CH_2SH \rightarrow 2\text{-PrOH} + \text{-}\dot{S}^-SCH_2(CHOH)_2CH_2\text{-} + H^+$	2.0×10^8	7.4			p.r.	P.b.k. at 390 nm ($DTT^{\cdot -}$) in N_2O-satd. soln. contg. dithiothreitol and 2-PrOH.	87A250
		2.0×10^8	7.3		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N_2O-satd. soln. contg. DTT.	87G007
		5.4×10^8	4			p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. 2-PrOH, dithiothreitol and $ABTS^{2-}$; the latter reacts with RS$^{\cdot}$ to give $ABTS^{\cdot -}$ which is observed.	82Z335
		2.1×10^8	7			p.r.	P.b.k. at 390 nm in soln. contg. 1 mol L^{-1} acetone and 2 mol L^{-1} 2-PrOH.	731020
16.384	**Duroquinone**							
	$(CH_3)_2\dot{C}OH + DQ \rightarrow CH_3COCH_3 + H^+ + [DQ]^{\cdot -}$	4.0×10^9	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	730125
16.385	**1-Ethoxycarbonyl-2,5-dimethyl-3-phenylisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + EDMPI \rightarrow [EDMPI]^{\cdot -} + CH_3COCH_3 + H^+$	2.3×10^9	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L^{-1} 2-PrOH.	84R027
16.386	**1-Ethoxycarbonyl-6-methoxy-5-methyl-2,3-trimethyleneisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + [EMMTI]^{\cdot -} \rightarrow EMMTI + CH_3COCH_3 + H^+$	2.3×10^9	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L^{-1} 2-PrOH.	84R027

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.387	**1-Ethoxycarbonyl-5-methyl-2,3-trimethyleneisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + [EMTI]^{\bullet-} \rightarrow EMTI + CH_3COCH_3 + H^+$	2.3×10^9	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L^{-1} 2-PrOH.	84R027
16.388	**1,1′-Ethylene-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + BP^{2+} \rightarrow BP^{\bullet+} + CH_3COCH_3 + H^+$	4.0×10^9	7.0			p.r.	P.b.k. at ~380 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} viologen.	84A292
16.389	**1,1′-Ethylene-4,4′-dimethyl-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + MDQ^{2+} \rightarrow MDQ^{\bullet+} + CH_3COCH_3 + H^+$	2.8×10^9	7.0			p.r.	P.b.k. at ~380 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} viologen.	84A292
16.390	***N*-Ethylmaleimide**							
	$(CH_3)_2\dot{C}OH + NEM \rightarrow$ addn.	5.0×10^9	6-7			p.r.	P.b.k. in soln. contg. 2-PrOH; 47% *e*-transfer, 50% addn. based on abs. spectra.	720144
16.391	**Flavine mononucleotide**							
	$(CH_3)_2\dot{C}OH + FMN \rightarrow$	1×10^9				p.r.	P.b.k.	73A150
16.392	**Folic acid**							
	$(CH_3)_2\dot{C}OH + FH \rightarrow CH_3COCH_3 + H^+ + {}^{\bullet}\overline{FH}$	4.0×10^8	6.0			p.r.	P.b.k.; structure and abs. spectra of reduced species dependent on pH.	761060
16.393	**Folic acid, protonated**							
	$(CH_3)_2\dot{C}OH + FH_2^+ \rightarrow CH_3COCH_3 + H^+ + {}^{\bullet}\overline{FH}$	1.1×10^9	~0.5			p.r.	P.b.k.; structure and abs. spectra of reduced species dependent on pH.	761060
16.394	**Fullerene-C_{60}-γ-cyclodextrin complex**							
	$(CH_3)_2\dot{C}OH + \gamma\text{-CD}/C_{60} \rightarrow CH_3COCH_3 + \gamma\text{-CD}/C_{60}^{\bullet-} + H^+$	2.7×10^8				p.r.	D.k. at 331 nm, as well as p.b.k. at 302 nm, in N_2O-satd. soln. contg. 10% 2-PrOH.	93A433
16.395	**Fumaric acid**							
	$(CH_3)_2\dot{C}OH +$ *trans*-$HO_2CCH{=}CHCO_2H \rightarrow$	9.0×10^8	0.5			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH; 14% *e*-transfer; no *e*-transfer at pH 9.	730097
16.396	**Glutathione**							
	$(CH_3)_2\dot{C}OH + GSH \rightarrow GS^{\bullet} + 2\text{-PrOH}$	1.8×10^8	4			p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. 2-PrOH, glutathione and $ABTS^{2-}$; the latter reacts with $RS^{\bullet}$ to give $ABTS^{\bullet-}$ which is observed.	82Z335 83A167
16.397	**Glutathione, oxidized**							
	$(CH_3)_2\dot{C}OH + GSSG \rightarrow$	$\ll 10^7$	7			p.r.	No 420 nm abs. ($RSSR^-$) obs. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	720388
16.398	**Guanine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + GH^+ \rightarrow$ addn.	7.4×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368
16.399	**Guanosine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + GH+ \rightarrow$ addn.	4.3×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368
16.400	**Hematoporphyrin IX**							
	$(CH_3)_2\dot{C}OH + HP \rightarrow CH_3COCH_3 + H^+ + HP^{\bullet-}$	2.4×10^8	7.0			p.r.	P.b.k. at 600-650 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	741040
	$(CH_3)_2\dot{C}O^- + HP \rightarrow CH_3COCH_3 + HP^{\bullet-}$	1.1×10^9	13.0			p.r.	P.b.k. at 600-650 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	741040

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No. Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.401 Hexafluorobenzene							
$(CH_3)_2\dot{C}O^- + C_6F_6 \rightarrow CH_3COCH_3 + C_6F_6^{\bullet-}$	1.6×10^6	14			p.r.	D.k. at 350 nm in N_2O-satd. soln. contg. 40% 2-PrOH and 1.0 mol L^{-1} KOH.	93A041
16.402 1-Hydroxy-9,10-anthraquinone							
$(CH_3)_2\dot{C}OH$ + 1-AQ(OH) → $CH_3COCH_3 + H^+$ + 1-AQ$^{\bullet}$(OH)$^-$	3.2×10^9 2.8×10^9 1.5×10^9	2.0 8.0 12			p.r.	P.b.k. at >600 nm in N_2-satd. soln. contg. 5 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone; pK_a of semiquinone = 4.6, >14.	94A267
16.403 1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole							
$(CH_3)_2\dot{C}OH$ + (ImH)-NO_2 →	7×10^8				p.r.	D.k. at 320 nm in N_2O-satd. soln. contg. 2-PrOH.	741135
16.404 1-(2-Hydroxy-3-methoxypropyl)-2-nitroimidazole							
$(CH_3)_2\dot{C}OH$ + (ImH)-NO_2 → (ImH)-$NO_2^{\bullet-}$ + $CH_3COCH_3 + H^+$	2.8×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761070
16.405 2-Hydroxy-1,4-naphthoquinone							
$(CH_3)_2\dot{C}OH$ + 2-(OH)NQ → $CH_3COCH_3 + H^+$ + 2-(OH)NQ$^{\bullet-}$	3.4×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	731104
16.406 3-Hydroxy-2-nitrobenzoate ion							
$(CH_3)_2\dot{C}OH$ + 3-HO-2-$NO_2C_6H_3CO_2^-$ → $CH_3COCH_3 + H^+$ + [3-HO-2-$NO_2C_6H_3CO_2$]$^{\bullet 2-}$	3.3×10^8	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.407 Hypoxanthine							
$(CH_3)_2\dot{C}OH$ + HxOH → addn.	$\sim 4 \times 10^6$	6.5			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368
16.408 Hypoxanthine, conjugate acid							
$(CH_3)_2\dot{C}OH + HxOH_2^+$ → addn.	7.8×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368
16.409 Imidazolium							
$(CH_3)_2\dot{C}OH + ImH_2^+ \rightarrow CH_3COCH_3 + H^+ + [Im]^{\bullet}$	1.7×10^5	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.410 Indigodisulfonate ion							
$(CH_3)_2\dot{C}OH + IDS^{2-}$ →	4.0×10^9	7,9			p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH; 88% e-transfer.	731078
16.411 Indigotetrasulfonate ion							
$(CH_3)_2\dot{C}OH + ITS^{4-}$ →	4.2×10^9	7			p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH; 89% e-transfer.	731078
16.412 Indophenolate ion							
$(CH_3)_2\dot{C}OH + O{=}C_6H_4{=}NC_6H_4O^-$ →	4.0×10^9	9			p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. 2-PrOH; 86% e-transfer.	731078
16.413 Inosine							
$(CH_3)_2\dot{C}OH$ + Ino → addn.	6.4×10^6	6.5			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368
16.414 Inosine, conjugate base							
$(CH_3)_2\dot{C}OH + Ino^-$ → addn.	$\sim 10^6$	11.2			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.415	**Inosine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + InoH^+ \rightarrow$ addn.	3.2×10^7	0.4			p.r.	P.b.k. at 300 or 320 nm in N_2O-satd. soln. contg. 2-PrOH.	94A368
16.416	**Iodoacetamide**							
	$(CH_3)_2\dot{C}OH + ICH_2CONH_2 \rightarrow$	4×10^8				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L $mol^{-1}\ s^{-1}$.	731140
16.417	**Iodoacetate ion**							
	$(CH_3)_2\dot{C}OH + ICH_2CO_2^- \rightarrow$	7×10^7				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L $mol^{-1}\ s^{-1}$.	731140
16.418	**Iodocyclopentane**							
	$(CH_3)_2\dot{C}OH + c\text{-}C_5H_9I \rightarrow CH_3COCH_3 + I^- + H^+ + c\text{-}\dot{C}_5H_9$	2.3×10^5	1	0.1		chem.	D.k. at 407 nm in soln. contg. $[CrC(CH_3)_2OH^{2+}]$, 0.1 mol L^{-1} $HClO_4$ and 3 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.127 s^{-1}.	84M334
		7.8×10^4	1	0.1		chem.	D.k. at 407 nm in soln. contg. $[CrC(CH_3)_2OH^{2+}]$, 0.1 mol L^{-1} $HClO_4$ and 10 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.323 s^{-1}.	84M334
16.419	**Iodoethane**							
	$(CH_3)_2\dot{C}OH + C_2H_5I \rightarrow CH_3COCH_3 + I^- + H^+ + {}^{\bullet}CH_2CH_3$	1.7×10^4	1	0.1		chem.	D.k. at 407 nm in soln. contg. $[CrC(CH_3)_2OH^{2+}]$, 0.1 mol L^{-1} $HClO_4$ and 10 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.323 s^{-1}.	84M334
16.420	**Iodomethane**							
	$(CH_3)_2\dot{C}OH + CH_3I \rightarrow CH_3COCH_3 + I^- + H^+ + {}^{\bullet}CH_3$	6.0×10^2	1	0.1		chem.	D.k. at 407 nm in soln. contg. $[CrC(CH_3)_2OH^{2+}]$, 0.1 mol L^{-1} $HClO_4$ and 10 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.323 s^{-1}.	84M334
		$<10^5$	7			p.r.	C.k. in soln. contg. 50% 2-PrOH and 0.68 mol L^{-1} acetone; no reaction obs.; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 2.2 \times 10^9$ L $mol^{-1}\ s^{-1}$.	81A123
	$(CH_3)_2\dot{C}O^- + CH_3I \rightarrow CH_3COCH_3 + I^- + {}^{\bullet}CH_3$	1.1×10^8	~13			p.r.	C.k. in soln. contg. 50% 2-PrOH and 0.68 mol L^{-1} acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 2.2 \times 10^9$ L $mol^{-1}\ s^{-1}$.	81A123
16.421	**2-Iodopropane**							
	$(CH_3)_2\dot{C}OH + (CH_3)_2CHI \rightarrow CH_3COCH_3 + I^- + H^+ + (CH_3)_2\dot{C}H$	2.5×10^5	1	0.1		chem.	D.k. at 407 nm in soln. contg. $[CrC(CH_3)_2OH^{2+}]$, 0.1 mol L^{-1} $HClO_4$ and 3 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.127 s^{-1}.	84M334

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.421	**2-Iodopropane** — Continued							
		1.1×10^5	1	0.1		chem.	D.k. at 407 nm in soln. contg. $[CrC(CH_3)_2OH^{2+}]$, 0.1 mol L^{-1} $HClO_4$ and 10 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+}$ = 0.323 s^{-1}.	84M334
16.422	**Lipoamide**							
	$(CH_3)_2\dot{C}OH + LS_2 \rightarrow LS_2^{\bullet -} + CH_3COCH_3 + H^+$	1.4×10^8	10.8			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	86A363
		1.4×10^8	6			p.r.	P.b.k. at 400 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH. Lipoamide radical anion is formed from intermediate (addn. prod.?) which also decays to other prod. (half-life 4.1×10^{-4} s).	84A011
16.423	**Lumazine**							
	$(CH_3)_2\dot{C}OH + LH_2 \rightarrow CH_3COCH_3 + LH_3^{\bullet}$	1.3×10^9	0.8, 5.1			p.r.	P.b.k. in N_2O-satd. soln. contg. 1-2 mol L^{-1} 2-PrOH; 100% e-transfer.	751056
	$(CH_3)_2\dot{C}OH + LH^- \rightarrow CH_3COCH_3 + (LH_2)^{\bullet -}$	1.7×10^8	9.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 1-2 mol L^{-1} 2-PrOH; 70% e-transfer.	751056
16.424	**Lumazine dianion**							
	$(CH_3)_2\dot{C}O^- + L^{2-} \rightarrow CH_3COCH_3 + {}^{\bullet}LH^{2-}$	1.0×10^9	14.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 1-2 mol L^{-1} 2-PrOH; 85% e-transfer.	751056
16.425	**Lumiflavine**							
	$(CH_3)_2\dot{C}OH + LF \rightarrow CH_3COCH_3 + LFH^{\bullet}$	2.0×10^9	7		297	p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. 2-propanol.	83A073
16.426	**Lumiflavine semiquinone**							
	$(CH_3)_2\dot{C}OH + LFH^{\bullet} \rightarrow$	8.8×10^8	7		297	p.r.	Abs. changes at 550 nm in N_2O-satd. soln. contg. 2-PrOH; decay to LFH^- and LF_o from calcd. concn.-time profile.	83A073
16.427	**Maleic acid**							
	$(CH_3)_2\dot{C}OH + cis\text{-}HO_2CCH{=}CHCO_2H \rightarrow$	2.2×10^8	0.5			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH; 18% e-transfer; no e-transfer at pH 10.0 (dianion).	730097
16.428	**2-Mercaptobenzimidazole, conjugate acid**							
	$(CH_3)_2\dot{C}OH + MBZH^+ \rightarrow$ 2-PrOH + $[MBZ]^{\bullet +}$	1.3×10^9	<0			p.r.	P.b.k. at 610 nm in N_2-satd. soln. contg. 3.6 mol L^{-1} H_2SO_4, 5×10^{-4} mol L^{-1} 2-mercaptobenzimidazole and 2-PrOH.	95A083
16.429	**2-Mercaptoethanol**							
	$(CH_3)_2\dot{C}OH + HSCH_2CH_2OH \rightarrow$ 2 PrOH + $^{\bullet}SCH_2CH_2OH$	5.1×10^8	10			p.r.	P.b.k. ($RSSR^{\bullet -}$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	690553
16.430	**2-Mercaptopropionylglycine**							
	$(CH_3)_2\dot{C}OH + HSCH(CH_3)CONHCH_2CO_2H \rightarrow$	3.7×10^8				p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. 2-PrOH, mercaptopropionylglycine and $ABTS^{2-}$; the latter reacts with $RS^{\bullet}$ to give $ABTS^{\bullet -}$ which is observed.	82Z335
16.431	**5,10-Methenyltetrahydrofolate**							
	$(CH_3)_2\dot{C}OH + CH^+H_4$(folate) $\rightarrow$	1.3×10^8	1.5			p.r.	P.b.k. at 360 nm in soln. contg. 1 mol L^{-1} 2-PrOH.	91A041
16.432	**4-Methoxybenzenediazonium cation**							
	$(CH_3)_2\dot{C}OH + 4\text{-}CH_3OC_6H_4N_2^+ \rightarrow CH_3COCH_3 + 4\text{-}CH_3OC_6H_4 + N_2 + H^+$	3.2×10^9	4			p.r.	D.k. at 330 nm in soln. contg. 0.001 mol L^{-1} 2-PrOH.	81A297

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.433	**9-(2-Methoxy-4-methylsulfonylaminoanilino)acridinium**							
	$(CH_3)_2\dot{C}OH + mAMSA^+ \rightarrow CH_3COCH_3 + H^+ + mAMSA^\bullet$	1.2×10^9	7			p.r.	P.b.k. at 540 and 575 nm in N_2O-satd. soln. contg. 2×10^{-4} mol L^{-1} $mAMSA^+$ and 0.2 mol L^{-1} 2-PrOH.	84C001
16.434	**4-Methoxyphenyl-*N*-*tert*-butylnitrone**							
	$(CH_3)_2\dot{C}OH + 4\text{-}CH_3O\text{-}PBN \rightarrow$	1.5×10^6				p.r.	C.k. in N_2O-satd. soln. contg. *p*-nitroacetophenone and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	82A184
16.435	**4-Methyl-5-(aminocarbonyl)imidazolium**							
	$(CH_3)_2\dot{C}OH + 4\text{-Me-}5\text{-}CONH_2ImH^+ \rightarrow CH_3COCH_3 + H^+ + [4\text{-Me-}5\text{-}CONH_2ImH]^\bullet$	2.1×10^6	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.436	**Methyl-1,4-benzoquinone**							
	$(CH_3)_2\dot{C}OH + MeQ \rightarrow CH_3COCH_3 + H^+ + MeQ^{\bullet-}$	3.5×10^9	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	730125
16.437	**1-Methyl-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + 1\text{-Me-}2,2'\text{-}bpy^+ \rightarrow CH_3COCH_3 + H^+ + 1\text{-Me-}2,2'\text{-}bpy^\bullet$	3.7×10^8	7			p.r.	P.b.k. at 605 nm in deaerated soln. contg. 2-PrOH.	88N031
16.438	**4-Methyl-5-cyanoimidazolium**							
	$(CH_3)_2\dot{C}OH + 4\text{-Me-}5\text{-}CNImH^+ \rightarrow CH_3COCH_3 + H^+ + [4\text{-Me-}5\text{-}CNImH]^\bullet$	4.8×10^6	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.439	**Methylene Blue cation**							
	$(CH_3)_2\dot{C}OH + MB^+ \rightarrow CH_3COCH_3 + {}^\bullet MB + H^+$	4.4×10^9	7			p.r.	D.k. at 580 nm in N_2O-satd. soln. contg. 2-PrOH; 91% *e*-transfer.	731078
		4×10^9				p.r.	P.b.k.	73A150
16.440	**1-Methylguanosine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 1\text{-}MeGH^+ \rightarrow CH_3COCH_3 + 1\text{-}MeG^\bullet + H^+$	8.0×10^7	0.5			p.r.	P.b.k. in N_2O-satd. contg. 1-2 mol L^{-1} 2-PrOH; $pK_a = -2.4$.	751060
16.441	**1-Methylimidazolium**							
	$(CH_3)_2\dot{C}OH + 1\text{-}CH_3ImH^+ \rightarrow CH_3COCH_3 + H^+ + [1\text{-}CH_3ImH]^\bullet$	1.1×10^6	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.442	**2-Methylimidazolium**							
	$(CH_3)_2\dot{C}OH + 2\text{-}CH_3ImH_2^+ \rightarrow CH_3COCH_3 + H^+ + [2\text{-MeImH}]^\bullet$	1.3×10^4	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532
16.443	**4-Methylimidazolium**							
	$(CH_3)_2\dot{C}OH + 4\text{-MeImH}^+ \rightarrow CH_3COCH_3 + H^+ + [4\text{-MeImH}]^\bullet$	4.5×10^5	1	1.0	298	chem.	D.k. at 311 nm in N_2-satd. soln. contg. $CrC(CH_3)_2OH^{2+}$, 0.1 mol L^{-1} H^+ and 1 mol L^{-1} 2-PrOH; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	89A532

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.444	***S*-Methylmethionine**							
	$(CH_3)_2\dot{C}OH$ + $Me_2S^+CH_2CH_2CH(NH_3^+)CO_2^-$ →	$<2\times10^6$				p.r.	C.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH; no reaction obs.; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.0\times10^9$ L $mol^{-1}\ s^{-1}$.	91A184
16.445	**2-Methyl-1,4-naphthoquinone**							
	$(CH_3)_2\dot{C}OH$ + 2-CH_3NQ → $CH_3COCH_3 + H^+ + [2\text{-}CH_3NQ]^{\cdot-}$	4.2×10^9	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} acetone and 1 mol L^{-1} 2-PrOH.	730125
		4.1×10^9	7.0			p.r.	P.b.k. in soln. contg. 0.05 mol L^{-1} 2-PrOH; 91% *e*-transfer.	731047
		4.8×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH.	731104
		6.2×10^9	6.9			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 2-PrOH; 80% *e*-transfer.	723057
	$(CH_3)_2\dot{C}O^-$ + 2-CH_3NQ → CH_3COCH_3 + $[2\text{-}CH_3NQ]^{\cdot-}$	4.2×10^9	12.4			p.r.	P.b.k. in soln. contg. 0.05 mol L^{-1} 2-PrOH; 91% *e*-transfer.	731047
16.446	**1-Methylnicotinamide**							
	$(CH_3)_2\dot{C}OH$ + 3-py$^+$$(CH_3)CONH_2$ → CH_3COCH_3 + 3-py$^{\cdot}$$(CH_3)CONH_2 + H^+$	3.6×10^8	9.5			p.r.	P.b.k. (pyridinyl radical) in N_2O-satd. soln. contg. 1-2 mol L^{-1} 2-PrOH.	741089
16.447	**3-Methyl-2-nitroanisole**							
	$(CH_3)_2\dot{C}OH$ + 3-$CH_3C_6H_3$(2-NO_2)OCH_3 → $[3\text{-}CH_3C_6H_3(2\text{-}NO_2)OCH_3]^{\cdot-}$ + $CH_3COCH_3 + H^+$	2.3×10^8	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.448	**Methyl 4-nitrobenzenesulfonate**							
	$(CH_3)_2\dot{C}OH$ + 4-$O_2NC_6H_4SO_3CH_3$ → $[4\text{-}NO_2C_6H_4SO_3CH_3]^{\cdot-}$ + $CH_3COCH_3 + H^+$	2.4×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
16.449	**Methyl 4-nitrobenzoate**							
	$(CH_3)_2\dot{C}OH$ + 4-$O_2NC_6H_4CO_2CH_3$ → $[4\text{-}NO_2C_6H_4CO_2CH_3]^{\cdot-}$ + $CH_3COCH_3 + H^+$	2.3×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
16.450	**3-Methyl-2-nitrobenzoate ion**							
	$(CH_3)_2\dot{C}OH$ + 3-CH_3-2-$NO_2C_6H_3CO_2^-$ → $[3\text{-}CH_3\text{-}2\text{-}NO_2C_6H_3CO_2^-]^{\cdot-}$ + $CH_3COCH_3 + H^+$	1.9×10^8	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.451	**2-Methyl-5-nitroimidazole**							
	$(CH_3)_2\dot{C}OH$ + (ImH)-NO_2 → $(ImH)\text{-}NO_2^{\cdot-} + CH_3COCH_3 + H^+$	2.5×10^9				p.r.	P.b.k.	761075
16.452	**3-Methyl-2-nitrophenol**							
	$(CH_3)_2\dot{C}OH$ + 3-CH_3-2-$NO_2C_6H_3OH$ → $CH_3COCH_3 + H^+$ + 3-CH_3(2-NO_2)$C_6H_3OH^-$	2.9×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.453	**2-Methyl-2-nitrosopropane**							
	$(CH_3)_2\dot{C}OH + (CH_3)_3CNO$ → addn.	6.9×10^8	~7		~291	p.r.	P.b.k. (esr) in unbuffered N_2O-satd. soln. contg. 0.25 mol L^{-1} 2-PrOH and (0.25-15) × 10^{-3} mol L^{-1} MNP (assuming complete dimer dissociation).	91D097

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.454	**4-Methylphenyl-*N*-*tert*-butylnitrone**							
	$(CH_3)_2\dot{C}OH + 4\text{-}CH_3\text{-}PBN \rightarrow$	1×10^6				p.r.	C.k. in N_2O-satd. soln. contg. *p*-nitroacetophenone and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9\ L\ mol^{-1}\ s^{-1}$.	82A184
16.455	**5-Methyl-1-phenyl-2,3-trimethyleneisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + 5\text{-MPTI} \rightarrow [5\text{-MPTI}]^{\bullet -} + CH_3COCH_3 + H^+$	$\sim 2.4 \times 10^9$				p.r.	P.b.k. at 500 nm in deaerated soln. contg. 1 mol L^{-1} 2-PrOH.	82A329
16.456	**3-Methylpterin, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 3\text{-MPTH}^+ \rightarrow$	1.9×10^9	0.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; 100% *e*-transfer.	761060
16.457	**3-Methylpterin**							
	$(CH_3)_2\dot{C}OH + 3\text{-MPT} \rightarrow$	2.9×10^8	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; 100% *e*-transfer.	761060
16.458	**9-Methylpurine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 9\text{-MPH}^+ \rightarrow CH_3COCH_3 + 9\text{-MPH}_3^{\bullet 2+}$	1.9×10^9	~0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; $pK_a = 2.4$.	751060
16.459	**9-Methylpurine**							
	$(CH_3)_2\dot{C}OH + 9\text{-MP} \rightarrow CH_3COCH_3 + 9\text{-MPH}^{\bullet}$	1.7×10^8	8.6			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	751060
	$(CH_3)_2\dot{C}O^- + 9\text{-MP} \rightarrow CH_3COCH_3 + 9\text{-MP}^{\bullet -}$	8.7×10^8	13.6			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	751060
16.460	***N*-Methyl-2-pyridinealdoxime**							
	$(CH_3)_2\dot{C}OH + 2\text{-HON=CHC}_5H_4N^+CH_3 \rightarrow$	6×10^8	3,7,11			p.r.	P.b.k.; *e*-transfer.	761182
16.461	**1-Methylpyridinium**							
	$(CH_3)_2\dot{C}OH + 1\text{-Mepy}^+ \rightarrow$	3.7×10^5	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.015-0.103 mol L^{-1} H^+ and $(6.77\text{-}17.2) \times 10^{-3}$ mol L^{-1} 1-methylpyridinium iodide; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7\ L\ mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	83A421
16.462	**4-Methylpyridinium**							
	$(CH_3)_2\dot{C}OH + 4\text{-}CH_3\text{pyH}^+ \rightarrow$	7.3×10^4	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.00741-0.103 mol L^{-1} H^+ and $(24.2\text{-}104) \times 10^{-3}$ mol L^{-1} 4-methylpyridinium perchlorate; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7\ L\ mol^{-1}\ s^{-1}$ and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	83A421
16.463	**5-Methyl-1,2-trimethyleneisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + 5\text{-MTI} \rightarrow [5\text{-MTI}]^{\bullet -} + CH_3COCH_3 + H^+$	2.3×10^9	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L^{-1} 2-PrOH.	84R027
16.464	**1,4-Naphthoquinone**							
	$(CH_3)_2\dot{C}OH + NQ \rightarrow CH_3COCH_3 + H^+ + NQ^{\bullet -}$	3.6×10^9	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	730125
16.465	**Neutral Red cation**							
	$(CH_3)_2\dot{C}OH + NRH^+ \rightarrow CH_3COCH_3 + [NRH_2]^{\bullet +}$	2×10^9 6.9×10^9	5 8			p.r.	P.b.k. at 400 and 700 nm in soln. contg. 2-PrOH; $pK_a = 6.8$.	93A100

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No. Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.466 Nicotinamide							
$(CH_3)_2\dot{C}OH + 3\text{-}pyCONH_2 \rightarrow$	$<1 \times 10^6$	9.2			p.r.	P.b.k. at ~400 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.467 Nicotinamide, conjugate acid							
$(CH_3)_2\dot{C}OH + 3\text{-}pyH^+CONH_2 \rightarrow$ $3\text{-}py(H)CONH_2 + CH_3COCH_3 + H^+$	7.9×10^8	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.041-0.080 mol L^{-1} H^+ and $(1.95\text{-}4.88) \times 10^{-3}$ mol L^{-1} $3\text{-}pyH^+CONH_2$; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	83A421
	2.1×10^8	0.9			p.r.	P.b.k.; no e-transfer in neutral soln.	741089
	4.0×10^8	1.9			p.r.	P.b.k. at ~400 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.468 Nicotinamide adenine dinucleotide							
$(CH_3)_2\dot{C}OH + NAD^+ \rightarrow CH_3COCH_3 + H^+ + NAD^\bullet$	1.0×10^9	6.0			p.r.	P.b.k.	731104
	1.0×10^9				p.r.	Estd. from buildup and decay of $NAD^\bullet$ at 400 nm in soln. contg. 1 mol L^{-1} acetone, 1 mol L^{-1} 2-PrOH, 2×10^{-4} mol L^{-1} O_2, 2×10^{-5} mol L^{-1} benzoquinone and 0.02 mol L^{-1} NAD^+.	703013
16.469 Nifuroxime							
$(CH_3)_2\dot{C}OH + NF \rightarrow CH_3COCH_3 + H^+ + NF^{\bullet-}$	3.5×10^9				p.r.	*P.b.k.*	*761075*
	3.3×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH; 100% e-transfer.	731099
16.470 4-Nitroacetophenone							
$(CH_3)_2\dot{C}OH + PNAP \rightarrow [PNAP]^{\bullet-} + CH_3COCH_3 + H^+$	3.0×10^9	5			p.r.	P.b.k. at 360 nm in N_2O-satd. soln. contg. 10% 2-PrOH and 4×10^{-4} mol L^{-1} PNAP; k decreases ar higher % 2-PrOH.	89A469
	1.5×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH. $\Delta H\ddagger = 14.8$ kJ mol^{-1}, $\Delta S\ddagger = -15$ J K^{-1} mol^{-1} studied at 273-343 K.	84A305 88A099
	1.8×10^9	acid			p.r.	P.b.k. in soln. contg. 50% 2-PrOH.	82A222
	3.8×10^9	11			p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. 2-PrOH.	730122
$(CH_3)_2\dot{C}O^- + PNAP \rightarrow [PNAP]^{\bullet-} + CH_3COCH_3$	2.1×10^9	alk.			p.r.	P.b.k. in soln. contg. 0.05 mol L^{-1} NaOH and 50% 2-PrOH.	82A222
16.471 2-Nitroaniline							
$(CH_3)_2\dot{C}OH + 2\text{-}O_2NC_6H_4NH_2 \rightarrow CH_3COCH_3 + H^+ + [2\text{-}NO_2C_6H_4NH_2]^{\bullet-}$	9.2×10^8	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.472 3-Nitroaniline							
$(CH_3)_2\dot{C}OH + 3\text{-}O_2NC_6H_4NH_2 \rightarrow CH_3COCH_3 + H^+ + [3\text{-}NO_2C_6H_4NH_2]^{\bullet-}$	1.5×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.473 4-Nitroaniline							
$(CH_3)_2\dot{C}OH + 4\text{-}O_2NC_6H_4NH_2 \rightarrow CH_3COCH_3 + H^+ + [4\text{-}NO_2C_6H_4NH_2]^{\bullet-}$	5×10^8	4-5		293	p.r.	Condy.; N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
	1.9×10^9	10.7			p.r.	P.b.k. at 380 nm in N_2O-satd. soln. soln. contg. 0.1 mol L^{-1} 2-PrOH.	771118

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.473	**4-Nitroaniline — Continued**							
		7.2×10^8	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.474	**4-Nitroanisole**							
	$(CH_3)_2\dot{C}OH + 4\text{-}CH_3OC_6H_4NO_2 \rightarrow [4\text{-}CH_3OC_6H_4NO_2]^{\cdot-} + CH_3COCH_3 + H^+$	1.2×10^9	4-5		293	p.r.	Condy.; N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
16.475	***p*-Nitrobenzaldehyde**							
	$(CH_3)_2\dot{C}OH + 4\text{-}O_2NC_6H_4CHO \rightarrow [4\text{-}NO_2C_6H_4CHO]^{\cdot-} + CH_3COCH_3 + H^+$	2.8×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
16.476	**4-Nitrobenzaldoxime**							
	$(CH_3)_2\dot{C}OH + HON\text{-}CHC_6H_4\text{-}4\text{-}NO_2 \rightarrow CH_3COCH_3 + H^+ + [HON\text{-}CHC_6H_4\text{-}4\text{-}NO_2]^{\cdot-}$	2.0×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
16.477	**4-Nitrobenzamide**							
	$(CH_3)_2\dot{C}OH + 4\text{-}O_2NC_6H_4CONH_2 \rightarrow [4\text{-}NO_2C_6H_4CONH_2]^{\cdot-} + CH_3COCH_3 + H^+$	2.2×10^9	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH. $\Delta H^{\ddagger} = 14.5$ kJ mol^{-1}, $\Delta S^{\ddagger} = -18$ J K^{-1} mol^{-1} studied at 273-343 K.	88A099 84A305
16.478	**Nitrobenzene**							
	$(CH_3)_2\dot{C}O^- + C_6H_5NO_2 \rightarrow CH_3COCH_3 + [C_6H_5NO_2]^{\cdot-}$	3.0×10^9	13			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	660432
	$(CH_3)_2\dot{C}OH + C_6H_5NO_2 \rightarrow CH_3COCH_3 + H^+ + [C_6H_5NO_2]^{\cdot-}$	1.6×10^9	7			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	660432
16.479	**4-Nitrobenzenesulfonamide**							
	$(CH_3)_2\dot{C}OH + 4\text{-}O_2NC_6H_4SO_2NH_2 \rightarrow [4\text{-}NO_2C_6H_4SO_2NH_2]^{\cdot-} + CH_3COCH_3 + H^+$	2.3×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
16.480	**4-Nitrobenzenesulfonate ion**							
	$(CH_3)_2\dot{C}OH + 4\text{-}O_2NC_6H_4SO_3^- \rightarrow [4\text{-}O_2NC_6H_4SO_3]^{\cdot 2-} + CH_3COCH_3 + H^+$	1.7×10^9	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH. $\Delta H^{\ddagger} = 13.8$ kJ mol^{-1}, $\Delta S^{\ddagger} = -22$ J K^{-1} mol^{-1} studied at 273-343 K.	88A099 84A305
16.481	**2-Nitrobenzoate ion**							
	$(CH_3)_2\dot{C}OH + 2\text{-}NO_2C_6H_4CO_2^- \rightarrow CH_3COCH_3 + H^+ + [2\text{-}NO_2C_6H_4CO_2^-]^{\cdot-}$	5.4×10^8	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; at pH 0.8 k was the same ± 20-30%.	761111
16.482	**3-Nitrobenzoate ion**							
	$(CH_3)_2\dot{C}OH + 3\text{-}NO_2C_6H_4CO_2^- \rightarrow CH_3COCH_3 + H^+ + [3\text{-}NO_2C_6H_4CO_2]^{\cdot 2-}$	9.0×10^8	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; at pH 0.8 k was the same ± 20-30%.	761111
16.483	**4-Nitrobenzoate ion**							
	$(CH_3)_2\dot{C}OH + 4\text{-}NO_2C_6H_4CO_2^- \rightarrow CH_3COCH_3 + H^+ + [4\text{-}NO_2C_6H_4CO_2^-]^{\cdot-}$	3.1×10^9	4-5		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
		2.1×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; at pH 0.8 k was the same ± 20-30%.	761111
16.484	**4-Nitrobenzonitrile**							
	$(CH_3)_2\dot{C}OH + 4\text{-}O_2NC_6H_4CN \rightarrow [4\text{-}NO_2C_6H_4CN]^{\cdot-} + CH_3COCH_3 + H^+$	2.7×10^9	4-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH; $\Delta H^{\ddagger} = 16.1$ kJ mol^{-1}, $\Delta S^{\ddagger} = -10$ J K^{-1} mol^{-1} studied at 273-343 K.	88A099 84A305

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.485	**5-Nitro-2-furoate ion**							
	$(CH_3)_2\dot{C}OH + NF \rightarrow NF^{\bullet-} + CH_3COCH_3 + H^+$	1.5×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	730114
16.486	**2-Nitroimidazole**							
	$(CH_3)_2\dot{C}OH + (ImH)\text{-}NO_2 \rightarrow (ImH)\text{-}NO_2^{\bullet-} + CH_3COCH_3 + H^+$	3.5×10^9				p.r.	P.b.k.	761075
16.487	**4-Nitroimidazole**							
	$(CH_3)_2\dot{C}OH + (ImH)\text{-}NO_2 \rightarrow (ImH)\text{-}NO_2^{\bullet-} + CH_3COCH_3 + H^+$	3.5×10^9				p.r.	P.b.k.	761075
16.488	**2-Nitroisophthalate ion**							
	$(CH_3)_2\dot{C}OH + 2\text{-}NO_2C_6H_3\text{-}1,3\text{-}(CO_2^-)_2 \rightarrow [2\text{-}NO_2C_6H_3\text{-}1,3\text{-}(CO_2^-)_2]^{\bullet-} + CH_3COCH_3 + H^+$	1.5×10^8	7			p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
	$(CH_3)_2\dot{C}O^- + 2\text{-}NO_2C_6H_3\text{-}1,3\text{-}(CO_2^-)_2 \rightarrow [2\text{-}NO_2C_6H_3\text{-}1,3\text{-}(CO_2^-)_2]^{\bullet-} + CH_3COCH_3$	1.5×10^8	14			p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.489	***aci*-Nitromethane anion**							
	$(CH_3)_2\dot{C}OH + CH_2NO_2^- \rightarrow$ adduct formation	1.2×10^7	9.15		~285	p.r.	D.k. (esr) in N_2O-satd. soln. contg. (0.5-5) $\times 10^{-3}$ mol L^{-1} nitromethane and 0.25 mol L^{-1} 2-PrOH; $k = \sim 1.2 \times 10^7$ L $mol^{-1}\ s^{-1}$ for electron transfer.	88D069
		5.0×10^7	11.3		~285	p.r.	P.b.k. (esr) in N_2O-satd. soln. contg. (0.5-5) $\times 10^{-3}$ mol L^{-1} nitromethane and 0.25 mol L^{-1} 2-PrOH.	88D069
	$(CH_3)_2\dot{C}O^- + CH_2NO_2^- \rightarrow$ adduct formation	3.4×10^7	13.0		~285	p.r.	P.b.k. (esr) in N_2O-satd. soln. contg. (0.5-5) $\times 10^{-3}$ mol L^{-1} nitromethane and 0.25 mol L^{-1} 2-PrOH; d.k. gave $k = 4.0 \times 10^7$ L $mol^{-1}\ s^{-1}$.	88D069
16.490	**4-Nitroperoxybenzoic acid**							
	$(CH_3)_2\dot{C}OH + 4\text{-}O_2NC_6H_4CO_3H \rightarrow CH_3COCH_3 + H^+ + [4\text{-}O_2NC_6H_4CO_3H]^{\bullet-}$	3.3×10^9	5.0			p.r.	P.b.k. at 330 nm in N_2O-satd. soln. contg. 2-PrOH.	741078
16.491	***p*-Nitrophenethyl bromide**							
	$(CH_3)_2\dot{C}OH + p\text{-}O_2NC_6H_4CH_2CH_2Br \rightarrow [p\text{-}NO_2C_6H_4CH_2CH_2Br]^{\bullet-}$	$\sim 1.5 \times 10^9$	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH.	81A068
16.492	**2-Nitrophenol**							
	$(CH_3)_2\dot{C}OH + 2\text{-}O_2NC_6H_4OH \rightarrow [2\text{-}O_2NC_6H_4OH]^{\bullet-} + CH_3COCH_3 + H^+$	2.6×10^9	1			p.r.	P.b.k. in soln. contg. 2-PrOH.	690270
16.493	**4-Nitrophenol**							
	$(CH_3)_2\dot{C}OH + 4\text{-}O_2NC_6H_4OH \rightarrow [4\text{-}HOC_6H_4NO_2]^{\bullet-} + CH_3COCH_3 + H^+$	1.1×10^9	4-5		293	p.r.	Condy. changes in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
16.494	**2-Nitrophenoxide ion**							
	$(CH_3)_2\dot{C}O^- + 2\text{-}NO_2C_6H_4O^- \rightarrow [2\text{-}^-OC_6H_4NO_2]^{\bullet-} + CH_3COCH_3$	1.4×10^9	13			p.r.	P.b.k. in soln. contg. 2-PrOH.	690270
16.495	**2-Nitropyrrole**							
	$(CH_3)_2\dot{C}OH + 2\text{-}NP \rightarrow [2\text{-}NP]^{\bullet-} + CH_3COCH_3 + H^+$	2.0×10^9				p.r.	P.b.k.	761075
16.496	**3-Nitropyrrole**							
	$(CH_3)_2\dot{C}OH + 3\text{-}NP \rightarrow 3\text{-}NP + CH_3COCH_3 + H^+$	2.0×10^9				p.r.	P.b.k.	761075

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.497	**Nitrosobenzene**							
	$(CH_3)_2\dot{C}O^- + C_6H_5NO \rightarrow CH_3COCH_3 + C_6H_5\dot{N}O^-$	7.0×10^9	13.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 2-PrOH.	660433
	$(CH_3)_2\dot{C}OH + C_6H_5NO \rightarrow CH_3COCH_3 + C_6H_5\dot{N}OH$	5.0×10^9	7.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 2-PrOH.	660433
16.498	**2-Nitrothiophene**							
	$(CH_3)_2\dot{C}OH + 2\text{-NT} \rightarrow 2\text{-NT}^{\bullet-} + CH_3COCH_3 + H^+$	3.0×10^9				p.r.	P.b.k.	761075
16.499	**3-Nitrothiophene**							
	$(CH_3)_2\dot{C}OH + 3\text{-NT} \rightarrow 3\text{-NT}^{\bullet-} + CH_3COCH_3 + H^+$	2.0×10^9				p.r.	P.b.k.	761075
16.500	**2-Nitrotoluene**							
	$(CH_3)_2\dot{C}OH + 2\text{-}CH_3C_6H_4NO_2 \rightarrow CH_3COCH_3 + H^+ + [2\text{-}CH_3C_6H_4NO_2]^{\bullet-}$	4.8×10^8	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761020
16.501	**4-Nitrotoluene**							
	$(CH_3)_2\dot{C}OH + 4\text{-}CH_3C_6H_4NO_2 \rightarrow [4\text{-}CH_3C_6H_4NO_2]^{\bullet-} + CH_3COCH_3 + H^+$	1.4×10^9	4-5		293	p.r.	Condy.; N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	84A305
16.502	***p*-Nitro-α,α,α-trifluorotoluene**							
	$(CH_3)_2\dot{C}OH + 4\text{-}CF_3C_6H_4NO_2 \rightarrow 4\text{-}CF_3C_6H_4NO_2^{\bullet-} + CH_3COCH_3 + H^+$	1.9×10^9	4.5-6		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH; $\Delta H^{\ddagger} = 15.4$ kJ mol^{-1}, $\Delta S^{\ddagger} = -15$ J K^{-1} mol^{-1} studied at 273-343 K.	88A099 84A305
16.503	**5-Nitrouracil**							
	$(CH_3)_2\dot{C}OH + 5\text{-}NO_2U \rightarrow [5\text{-}NO_2U]^{\bullet-} + CH_3COCH_3 + H^+$	7×10^8				p.r.	P.b.k.	73A150
16.504	**Norpseudopelletierine *N*-oxyl**							
	$(CH_3)_2\dot{C}OH + NPPN \rightarrow$	8.1×10^8				p.r.	D.k. at 242 nm in soln. contg. 2-PrOH.	710061
16.505	**Orotate ion**							
	$(CH_3)_2\dot{C}OH + 6\text{-}UCO_2^- \rightarrow [6\text{-}UCO_2^-]^{\bullet-} + CH_3COCH_3 + H^+$	1×10^8				p.r.	P.b.k.	73A150
16.506	**Penicillamine**							
	$(CH_3)_2\dot{C}OH + PenSH \rightarrow PenS^{\bullet} + 2\text{-PrOH}$	1.2×10^8				p.r.	C.k. with $^{\bullet}CCl_3$ formation in N_2O-satd. soln. contg. 50% 2-PrOH, varied $[CCl_4]$ and 0.01 mol L^{-1} penicillamine; rel. to $k((CH_3)_2\dot{C}OH + CCl_4) = 1.2 \times 10^8$ L mol^{-1} s^{-1}.	89A469
		3.0×10^8				p.r.	P.b.k. at 415 nm in N_2O-satd. soln. contg. 2-PrOH, penicillamine and $ABTS^{2-}$; the latter reacts with $RS^{\bullet}$ to give $ABTS^{\bullet-}$ which is observed.	82Z335
16.507	**1,10-Phenanthroline, conjugate acid**							
	$(CH_3)_2\dot{C}OH + phenH^+ \rightarrow CH_3COCH_3 + [phenH_2]^{\bullet+}$	3.2×10^9	1			p.r.	P.b.k. at 520 nm in soln. contg. 1 mol L^{-1} 2-PrOH; $pK_a = 4.9$.	80A115
		1.9×10^9	3.0			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	79A148
16.508	**1,10-Phenanthroline**							
	$(CH_3)_2\dot{C}OH + phen \rightarrow CH_3COCH_3 + phenH^{\bullet}$	1×10^8	5.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	80A115
		$<1 \times 10^7$	8					
		1.2×10^7	7				P.b.k. in soln. contg. 2-PrOH and acetone.	79A148
	$(CH_3)_2\dot{C}O^- + phen \rightarrow CH_3COCH_3 + phenH^{\bullet}$	3.0×10^9	~13			p.r.	P.b.k. at 490 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	80A115

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.508	**1,10-Phenanthroline** — Continued							
		5.7×10^8	13			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	79A305
		6.0×10^8	13			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	79A148
16.509	**Phenazine**							
	$(CH_3)_2\dot{C}O^- + Pz \rightarrow CH_3COCH_3 + {}^{\bullet}PzH$	3×10^9	13			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	79A305
16.510	**Phenosafranine cation**							
	$(CH_3)_2\dot{C}OH + PSF^+ \rightarrow$	3.2×10^9	7			p.r.	D.k. at 520 nm in N_2O-satd. soln. contg. 2-PrOH; 82% *e*-transfer.	731078
16.511	**Phenyl-*N*-*tert*-butylnitrone**							
	$(CH_3)_2\dot{C}OH + PBN \rightarrow$	1.0×10^7				p.r.	C.k. in N_2O-satd. soln. contg. *p*-nitroacetophenone and 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9\ L\ mol^{-1}\ s^{-1}$.	82A184
16.512	**Phenylthiourea**							
	$(CH_3)_2\dot{C}OH + C_6H_5NHCSNH_2 \rightarrow C_6H_5NH\dot{C}(SH)NH_2 + CH_3COCH_3$	5×10^8	<0			p.r.	P.b.k. at 410 nm in N_2-purged soln. contg. 1 mol L^{-1} 2-PrOH and 3.5 mol L^{-1} H_2SO_4; yield of reduced species was lower at lower acid concn.	94A002
16.513	***p*-Phthalate ion**							
	$(CH_3)_2\dot{C}O^- + 1,4\text{-}C_6H_4(CO_2^-)_2 \rightarrow CH_3COCH_3 + [1,4\text{-}C_6H_4(CO_2^-)_2]^{\bullet-}$	1.7×10^7	~13			p.r.	P.b.k. at 360 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	89A242
16.514	**Primaquine**							
	$(CH_3)_2\dot{C}OH + PQ \rightarrow$	1.3×10^9 $\leq 10^7$	1.8 ~7			p.r.	P.b.k. at 480-500 nm in soln. contg. 2-PrOH.	88A471
16.515	**1,3-Propanediylbis(1′-methyl-4,4′-bipyridinium)**							
	$(CH_3)_2\dot{C}OH + PTQ^{4+} \rightarrow CH_3COCH_3 + H^+ + PTQ^{\bullet 3+}$	3.5×10^9	7			p.r.	P.b.k. at 605 nm in N_2-satd. soln. contg. 1% 2-PrOH and $(0\text{-}4) \times 10^{-4}$ mol L^{-1} viologen.	85A301
16.516	**Pterin**							
	$(CH_3)_2\dot{C}OH + PnH \rightarrow$	4.5×10^8	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; ~100% *e*-transfer.	761060
16.517	**Pterin, conjugate acid**							
	$(CH_3)_2\dot{C}OH + PnH_2^+ \rightarrow$	2.0×10^9	0.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; ~100% *e*-transfer.	761060
16.518	**Pterin, conjugate base**							
	$(CH_3)_2\dot{C}OH + Pn^- \rightarrow$	$\ll 10^7$	9.4			p.r.	No electron transfer obs. in N_2O-satd. soln. contg. 2-PrOH.	761060
	$(CH_3)_2\dot{C}O^- + Pn^- \rightarrow$	1.5×10^9	13.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; ~100% *e*-transfer.	761060
16.519	**Purine**							
	$(CH_3)_2\dot{C}OH + C_5H_4N_4 \rightarrow$	$<10^7$	6.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 1-2 mol L^{-1} 2-PrOH.	751060
16.520	**Purine, conjugate monoacid**							
	$(CH_3)_2\dot{C}OH + (C_5H_4N_4)H^+ \rightarrow$	2.7×10^9	~0			p.r.	P.b.k. in N_2O-satd. soln. contg. 1-2 mol L^{-1} 2-PrOH; $pK_a = 2.4, 9.0$.	751060

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.521	**Purine, conjugate base**							
	$(CH_3)_2\dot{C}O^- + C_5H_3N_4^- \rightarrow$	$<10^7$	13.3			p.r.	P.b.k. in N_2O-satd. soln. contg. 1-2 mol L^{-1} 2-PrOH.	751060
16.522	**Pyrazine**							
	$(CH_3)_2\dot{C}OH + pz \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	741127
	$(CH_3)_2\dot{C}O^- + pz \rightarrow$	1.7×10^9	13.6			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	741127
16.523	**Pyrazine, conjugate monoacid**							
	$(CH_3)_2\dot{C}OH + pzH^+ \rightarrow$	2.8×10^9	~0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; $k \simeq 5 \times 10^9$ L mol^{-1} s^{-1} in 70% $HClO_4$ soln.	741127
16.524	**Pyrazinecarboxylic acid**							
	$(CH_3)_2\dot{C}OH + pzCO_2H \rightarrow 2\ H^+ + CH_3COCH_3 + [pzCO_2]^{\cdot 2-}$	8.5×10^8	1-5.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH and 10^{-4}-10^{-2} mol L^{-1} $pzCO_2H/pzCO_2^-$.	82A146
16.525	**Pyrene**							
	$(CH_3)_2\dot{C}O^- + Py \rightarrow CH_3COCH_3 + Py^{\cdot -}$	2.3×10^9	13			p.r.	P.b.k. at 495 nm in soln. contg. 2×10^{-4} mol L^{-1} pyrene, 0.2 mol L^{-1} 2-PrOH, 0.1 mol L^{-1} acetone and 5×10^{-3}	761062
16.526	**Pyridazine**							
	$(CH_3)_2\dot{C}O^- + pdz + H_2O \rightarrow CH_3COCH_3 + [pdzH]^{\cdot} + OH^-$	2.1×10^9	13.6			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	741127
	$(CH_3)_2\dot{C}OH + pdz \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	741127
16.527	**Pyridazine, conjugate monoacid**							
	$(CH_3)_2\dot{C}OH + pdzH^+ \rightarrow CH_3COCH_3 + [pdzH_2]^{\cdot +}$	2.6×10^9	~0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	741127
16.528	**4-Pyridinealdoxime, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 4\text{-}HON{=}CHC_5H_4NH^+ \rightarrow$	1.7×10^9	acid			p.r.	P.b.k. (pyridinyl radical) in N_2O-satd. soln. contg. 2-PrOH.	761182
16.529	**4-Pyridinealdoxime**							
	$(CH_3)_2\dot{C}OH + 4\text{-}HON{=}CHC_5H_4N \rightarrow$	$\ll 10^7$	7			p.r.	P.b.k. (pyridinyl radical) in N_2O-satd. soln. contg. 2-PrOH; *e*-transfer in strong acid or base.	761182
	$(CH_3)_2\dot{C}O^- + 4\text{-}HON{=}CHC_5H_4N \rightarrow$	1.7×10^8	13.3			p.r.	P.b.k. (pyridinyl radical) in N_2O-satd. soln. contg. 2-PrOH.	761182
16.530	**Pyridine-4-carboxamide, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 4\text{-}pyH^+CONH_2 \rightarrow CH_3COCH_3 + H^+ + 4\text{-}py(H)CONH_2$	1.2×10^9	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.077-0.232 mol L^{-1} H^+ and $(1.56\text{-}5.47) \times 10^{-3}$ mol L^{-1} 4-pyH^+CONH_2; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	83A421
		3.1×10^9	0.7			p.r.	P.b.k. (pyridinyl radical) in N_2O-satd. soln. contg. 2-PrOH.	741089
16.531	**2-Pyridinecarboxylate ion**							
	$(CH_3)_2\dot{C}O^- + 2\text{-}pyCO_2^- \rightarrow 2\text{-}\dot{p}yCO_2^- + CH_3COCH_3 + H^+$	4×10^7	13.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A257
16.532	**3-Pyridinecarboxylate ion**							
	$(CH_3)_2\dot{C}O^- + 3\text{-}pyCO_2^- \rightarrow 3\text{-}\dot{p}yCO_2^- + CH_3COCH_3$	9×10^7	13.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A257

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.532	**3-Pyridinecarboxylate ion — Continued**							
		$\geq 1 \times 10^8$	13.1			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
	$(CH_3)_2\dot{C}OH + 3\text{-}pyCO_2^- \rightarrow$	$<1 \times 10^6$	8.2			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.533	**4-Pyridinecarboxylate ion**							
	$(CH_3)_2\dot{C}O^- + 4\text{-}pyCO_2^- \rightarrow 4\text{-}\dot{p}yCO_2^- + CH_3COCH_3$	7×10^7	13.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A257
		2×10^8	13.3			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
	$(CH_3)_2\dot{C}OH + 4\text{-}pyCO_2^- \rightarrow$	$<1 \times 10^6$	9.0			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.534	**2-Pyridinecarboxylic acid**							
	$(CH_3)_2\dot{C}OH + 2\text{-}pyH^+CO_2^- \rightarrow [2\text{-}pyH^+CO_2^-]^{\cdot -} + CH_3COCH_3 + H^+$	1.5×10^9 1.5×10^8	0 3.8			p.r.	P.b.k. at 305 and 330 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH; $pK_a = 0.79, 5.39$.	92A458
		1.9×10^9	1			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A257
16.535	**3-Pyridinecarboxylic acid**							
	$(CH_3)_2\dot{C}OH + 3\text{-}pyH^+CO_2^- \rightarrow [3\text{-}pyH^+CO_2^-]^{\cdot -} + CH_3COCH_3 + H^+$	2×10^8	1			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH; $pK_a = 1.0, 4.83$.	91A257
		1.8×10^8	3.4				P.b.k. at ~400 nm (pyridinyl radical) in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.536	**3-Pyridinecarboxylic acid, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 3\text{-}pyH^+CO_2H \rightarrow$	3.5×10^8	0.0			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.537	**4-Pyridinecarboxylic acid**							
	$(CH_3)_2\dot{C}OH + 4\text{-}pyH^+CO_2^- \rightarrow [4\text{-}pyH^+CO_2^-]^{\cdot -} + CH_3COCH_3 + H^+$	3×10^9	1			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A257
		8.5×10^8	3.2			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.538	**4-Pyridinecarboxylic acid, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 4\text{-}pyH^+CO_2H \rightarrow$	2.0×10^9	0.4			p.r.	P.b.k. at ~400 nm (pyridinyl radical) in N_2O-satd. soln. contg. 0.5 mol L^{-1} 2-PrOH.	741106
16.539	**3,5-Pyridinedicarboxlyate dianion**							
	$(CH_3)_2\dot{C}O^- + 3,5\text{-}py(CO_2^-)_2 \rightarrow [3,5\text{-}py(CO_2^-)_2]^{\cdot -} + CH_3COCH_3 + H^+$	1.6×10^8	13.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A257
16.540	**2,6-Pyridinedicarboxyate dianion**							
	$(CH_3)_2\dot{C}O^- + 2,6\text{-}py(CO_2^-)_2 \rightarrow [2,6\text{-}py(CO_2^-)_2]^{\cdot -} + CH_3COCH_3 + H^+$	1×10^8	13.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A257
16.541	**2,6-Pyridinedicarboxylic acid**							
	$(CH_3)_2\dot{C}OH + 2,6\text{-}pyH^+(CO_2H)(CO_2^-) \rightarrow [2,6\text{-}pyH^+(CO_2^-)_2]^{\cdot -} + CH_3COCH_3 + H^+$	5×10^8	1			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A257
16.542	**3,5-Pyridinedicarboxylic acid**							
	$(CH_3)_2\dot{C}OH + 3,5\text{-}py(CO_2H)_2 \rightarrow [3,5\text{-}pyH^+(CO_2^-)_2]^{\cdot -} + CH_3COCH_3 + H^+$	2.2×10^9	1			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	91A257

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.543	**Pyridinium**							
	$(CH_3)_2\dot{C}OH + pyH^+ \rightarrow$	9.6×10^5	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.012-0.259 mol L^{-1} H^+ and $(5.0\text{-}54) \times 10^{-3}$ mol L^{-1} pyridinium perchlorate; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for *homolysis of* $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	83A421
16.544	**Pyridinium, 4-(aminocarbonyl)-1-(3-carboxypropyl)-**							
	$(CH_3)_2\dot{C}OH +$ $4\text{-}NH_2COpy^+(CH_2)_3CO_2^- \rightarrow$ $CH_3COCH_3 + H^+ +$ $[4\text{-}NH_2COpy(CH_2)_3CO_2]^{\cdot -}$	3.7×10^9 2.6×10^9	1 4.5-5.5		295	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	83B029
16.545	**3-Pyridinol, conjugate acid**							
	$(CH_3)_2\dot{C}OH + 3\text{-}HOpyH^+ \rightarrow$ addn.	3.8×10^8	2.6			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 0.2 mol L^{-1} acetone.	90A329
		1.4×10^8	acid	1.0	298	chem.	D.k. in N_2-satd. soln. contg. $CrCH(CH_3)_2OH^{2+}$, 0.046-0.203 mol L^{-1} H^+ and $(2.65\text{-}9.36) \times 10^{-3}$ mol L^{-1} 3-hydroxypyridinium perchlorate; k calcd. using $k((CH_3)_2\dot{C}OH + Cr^{2+}) = 5.1 \times 10^7$ L mol^{-1} s^{-1} and k for homolysis of $CrC(CH_3)_2OH^{2+} = 0.127\ s^{-1}$.	83A421
16.546	**3-Pyridinol**							
	$(CH_3)_2\dot{C}OH + 3\text{-}pyOH \rightarrow$ addn.	1.1×10^7	6.8			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 0.2 mol L^{-1} acetone.	90A329
16.547	**Pyridoxal 5-phosphate**							
	$(CH_3)_2\dot{C}OH + PPH \rightarrow CH_3COCH_3 +$ $^{\cdot}PPH_2$	1.3×10^8	5.6			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	751024
16.548	**Pyridoxal 5-phosphate, conjugate acid**							
	$(CH_3)_2\dot{C}OH + PPH_2^+ + H^+ \rightarrow$ $CH_3COCH_3 + {}^{\cdot}PPH_3^+$	5.8×10^8	1.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	751024
16.549	**Pyridoxal 5-phosphate, conjugate base**							
	$(CH_3)_2\dot{C}O^- + PP^- + H^+ \rightarrow CH_3COCH_3$ $+ {}^{\cdot}PPH^-$	2.9×10^8	10.0, 13.3			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	751024
16.550	**Pyridoxine**							
	$(CH_3)_2\dot{C}OH + PH \rightarrow$	$\ll 10^7$	1,7, 13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	751024
16.551	**α-(4-Pyridyl 1-oxide)-*N*-*tert*-butylnitrone**							
	$(CH_3)_2\dot{C}OH + 4\text{-}POBN \rightarrow$ $4\text{-}POBN\text{-}COH(CH_3)_2$	1×10^8				p.r.	P.b.k. at 270 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	86A472 83A388
		3.8×10^8	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	84A426
16.552	**Pyrimidine**							
	$(CH_3)_2\dot{C}OH + Pm \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in N_2O-satd.soln. contg. 2-PrOH.	741127
	$(CH_3)_2\dot{C}O^- + Pm \rightarrow$	$\ll 10^7$	13.6			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	741127
16.553	**Pyrimidine, conjugate monoacid**							
	$(CH_3)_2\dot{C}OH + PmH^+ \rightarrow CH_3COCH_3 +$ $^{\cdot}PmH_2^+$	2.2×10^9	~0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	741127

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
16.554	**Quinoxaline**							
	$(CH_3)_2\dot{C}OH + Qx \rightarrow CH_3COCH_3 + {}^{\bullet}QxH$	1.6×10^8	6.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH.	741127
16.555	**Quinoxaline, conjugate monoacid**							
	$(CH_3)_2\dot{C}OH + QxH^+ \rightarrow CH_3COCH_3 + {}^{\bullet}QxH_2^+$	3.7×10^9	~0			p.r.	P.b.k. in N_2O-satd. soln. contg. 2 mol L^{-1} $HClO_4$ and 2 mol L^{-1} 2-PrOH; $k \approx 7.0 \times 10^8$ in 70% $HClO_4$.	741127
16.556	**Riboflavine**							
	$(CH_3)_2\dot{C}OH + RF \rightarrow$	2.3×10^9	7.0			p.r.	P.b.k. at 560 nm in N_2O-satd. soln. contg. 2-PrOH; *e*-transfer.	731104
16.557	**Safranine cation**							
	$(CH_3)_2\dot{C}OH + ST^+ \rightarrow$	2.8×10^9	7			p.r.	D.k. at 520 nm in N_2O-satd. soln. contg. 2-PrOH; 86% *e*-transfer.	731078
16.558	**Tetracycline**							
	$(CH_3)_2\dot{C}OH + TC \rightarrow CH_3COCH_3 + H^+ + TC^{\bullet-}$	4.7×10^7	6.8			p.r.	P.b.k. at 630 nm in N_2O-satd. soln. contg. 2-PrOH.	94A209
16.559	**Tetrafluoro-1,4-benzoquinone**							
	$(CH_3)_2\dot{C}OH + F_4Q \rightarrow CH_3COCH_3 + H^+ + F_4O^{\bullet-}$	3.7×10^9	5.7			p.r.	P.b.k. at 435 nm in N_2O-satd. soln. contg. 1 mol L^{-1} 2-PrOH.	94A417
16.560	**5,10,15,20-Tetrakis(4-carboxyphenyl)porphine**							
	$(CH_3)_2\dot{C}OH + H_2TCPP^{4-} \rightarrow CH_3COCH_3 + H^+ + [H_2TCPP]^{\bullet 5-}$	9×10^8	7-11			p.r.	P.b.k. at 460 and 700 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH.	79A143
16.561	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphine**							
	$(CH_3)_2\dot{C}OH + H_2TMpyP^{4+} \rightarrow [H_3TMpyP]^{\bullet 4+} + CH_3COCH_3$	5×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and 10^{-4} mol L^{-1} porphyrin.	82A152
	$(CH_3)_2\dot{C}O^- + HTMpyP^{3+} \rightarrow [H_2TMpyP]^{\bullet 3+} + CH_3COCH_3$	6.3×10^9	13			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and 10^{-4} mol L^{-1} porphyrin.	82A152
16.562	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphine**							
	$(CH_3)_2\dot{C}OH + H_2TPPS^{4-} \rightarrow [H_3TPPS]^{\bullet 4-} + CH_3COCH_3$	5.0×10^7	8.0-8.5			p.r.	Abs. changes in soln. contg. 2-PrOH.	92A304
		$\sim 2 \times 10^9$	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and 10^{-4} mol L^{-1} porphyrin.	82A152
	$(CH_3)_2\dot{C}O^- + HTPPS^{5-} \rightarrow [H_2TPPS]^{\bullet 5-} + CH_3COCH_3$	$\sim 1 \times 10^9$	13			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and 10^{-4} mol L^{-1} porphyrin.	82A152
16.563	**1,1′-Tetramethylene-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + BP^{2+} \rightarrow BP^{\bullet +} + CH_3COCH_3 + H^+$	3.0×10^9	7.0			p.r.	P.b.k. at ~380 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} viologen.	84A292
16.564	**4,5,4′,5′-Tetramethyl-1,1′-ethylene-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + BP^{2+} \rightarrow BP^{\bullet +} + CH_3COCH_3 + H^+$	5.5×10^8	7.0			p.r.	P.b.k. at ~380 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} viologen.	84A292
16.565	**1,2,3,5-Tetramethylisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + TMI \rightarrow [TMI]^{\bullet -} + CH_3COCH_3 + H^+$	2.3×10^9	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L^{-1} 2-PrOH.	84R027
16.566	**1,2,5,6-Tetramethyl-3-phenylisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + TMPI \rightarrow [TMPI]^{\bullet -} + CH_3COCH_3 + H^+$	2.3×10^9	7			p.r.	P.b.k. at 500 nm in deaerated soln. contg. 3 mol L^{-1} 2-PrOH.	84R027

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
16.567	**2,2,6,6-Tetramethylpiperidine-*N*-oxyl**							
	$(CH_3)_2\dot{C}OH$ + TMPN → electron transfer	3.6×10^8	acid			p.r.	Condy.; N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761067
16.568	**2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl**							
	$(CH_3)_2\dot{C}OH$ + TAN → addn.	4.3×10^8	acid			p.r.	Condy.; N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	761067
		4.7×10^8	5-6			p.r.	C.k. in N_2O-satd. soln. contg. 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	710618
		3.9×10^8	5-6			p.r.	C.k. in N_2O-satd. soln. contg. 2-PrOH; rel. to $k((CH_3)_2\dot{C}OH + Fe(CN)_6^{3-}) = 4.7 \times 10^9$ L mol^{-1} s^{-1}.	710618
16.569	**4,5,4′,5′-Tetramethyl-1,1′-tetramethylene-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + BP^{2+} \rightarrow BP^{\cdot+} + CH_3COCH_3 + H^+$	1.7×10^8	7.0			p.r.	P.b.k. at ~380 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} viologen.	84A292
16.570	**4,5,4′,5′-Tetramethyl-1,1′-trimethylene-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + BP^{2+} \rightarrow CH_3COCH_3 + H^+ + BP^{\cdot+}$	9.0×10^8	7.0			p.r.	P.b.k. at ~380 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} viologen.	84A292
16.571	**Tetranitromethane**							
	$(CH_3)_2\dot{C}OH + C(NO_2)_4 \rightarrow CH_3COCH_3 + H^+ + C(NO_2)_3^- + {}^{\cdot}NO_2$	5×10^9	1.0			f.p.	P.b.k. at 365 nm in soln. contg. 8.5×10^{-3} mol L^{-1} TiO_2 and $(6\text{-}300) \times 10^{-6}$ mol L^{-1} TNM, along with Cl^- and 2-PrOH.	82N025
		5.0×10^9				p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	640133
16.572	**Thiamine, conjugate acid**							
	$(CH_3)_2\dot{C}OH + ThmH^{2+} \rightarrow CH_3COCH_3 + {}^{\cdot}ThmH^+$	2.2×10^8	0.5			p.r.	P.b.k. in soln. contg. 2-PrOH.	771034
16.573	**Thiamine cation**							
	$(CH_3)_2\dot{C}OH + Thm^+ \rightarrow CH_3COCH_3 + {}^{\cdot}Thm + H^+$	1.9×10^8	6.6			p.r.	P.b.k. in soln. contg. 2-PrOH.	771034
16.574	**Thiazole**							
	$(CH_3)_2\dot{C}O^- + Tz \rightarrow$		13.3			p.r.	No electron transfer obs.	771034
16.575	**Thiazole, conjugate acid**							
	$(CH_3)_2\dot{C}OH + TzH^+ \rightarrow CH_3COCH_3 + {}^{\cdot}TzH$	6.2×10^8	0.8			p.r.	P.b.k. in soln. contg. 2-PrOH.	771034
16.576	**Thionine cation**							
	$(CH_3)_2\dot{C}OH + Th^+ \rightarrow CH_3COCH_3 + H^+ + {}^{\cdot}Th$	4.6×10^9	6.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH and 10^{-4} mol L^{-1} thionine.	87A451
		4.2×10^9	8			p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. 2-PrOH; 88% e-transfer.	731078
16.577	**Thiosemicarbazide**							
	$(CH_3)_2\dot{C}OH + NH_2NHCSNH_2 \rightarrow$	2.0×10^8	<0			p.r.	P.b.k. at 400 nm in soln. contg. 3.6 mol L^{-1} H_2SO_4 and 1 mol L^{-1} 2-PrOH. Mechanism suggested to be protonation at S and H abstr. from NH.	94A284
16.578	**Toluidine Blue cation**							
	$(CH_3)_2\dot{C}OH + TB^+ \rightarrow CH_3COCH_3 + [TBH]^{\cdot+}$	3.7×10^9	6.8			p.r.	P.b.k. at 830 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH.	89A262

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
16.579	**Trichloroacetate ion**							
	$(CH_3)_2\dot{C}OH + Cl_3CCO_2^- \rightarrow$	5×10^6				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	731140
	$(CH_3)_2\dot{C}O^- + Cl_3CCO_2^- \rightarrow$	3×10^8	13			p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	731140
16.580	**Trifluoroacetate ion**							
	$(CH_3)_2\dot{C}OH + CF_3CO_2^- \rightarrow$	$<1 \times 10^5$				p.r.	C.k. in soln. contg. 2-PrOH and acetone; rel. to $k((CH_3)_2\dot{C}OH + PNAP) = 3.8 \times 10^9$ L mol^{-1} s^{-1}.	731140
16.581	**2-[3-(*N,N,N*-Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene**							
	$(CH_3)_2\dot{C}O^- + TX^+ \rightarrow CH_3COCH_3 + TX^\bullet$	4.0×10^8	12			p.r.	D.k. in N_2-satd. soln. contg. 10% 2-PrOH.	88A109
16.582	**2,3,5-Trimethyl-1,4-benzoquinone**							
	$(CH_3)_2\dot{C}OH + 2,3,5\text{-}(CH_3)_3Q \rightarrow CH_3COCH_3 + H^+ + [2,3,5\text{-}(CH_3)_3Q]^{\bullet-}$	3.6×10^9	7			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	730125
16.583	**1,1′-Trimethylene-2,2′-bipyridinium**							
	$(CH_3)_2\dot{C}OH + TQ^{2+} \rightarrow TQ^{\bullet+} + CH_3COCH_3 + H^+$	3.9×10^9	7.0			p.r.	P.b.k. at ~380 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} 2-PrOH and 2.5×10^{-4} mol L^{-1} viologen.	84A292
16.584	**1,2,5-Trimethyl-3-phenylisoindole-4,7-dione**							
	$(CH_3)_2\dot{C}OH + TMPI \rightarrow [TMPI]^{\bullet-} + CH_3COCH_3 + H^+$	$\sim 2.4 \times 10^9$				p.r.	P.b.k. at 500 nm in deaerated soln. contg. 1 mol L^{-1} 2-PrOH.	82A329
16.585	**2,4,6-Trinitrobenzoate ion**							
	$(CH_3)_2\dot{C}OH + 2,4,6\text{-}(NO_2)_3C_6H_2CO_2^- \rightarrow CH_3COCH_3 + H^+ + [2,4,6\text{-}(NO_2)_3C_6H_2CO_2]^{\bullet 2-}$	3.9×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. 2-PrOH; k at pH 0.8 within 20-30%.	761111
16.586	**Trypan Blue tetraanion**							
	$(CH_3)_2\dot{C}OH + TB^{4-} \rightarrow$	3×10^9				p.r.	P.b.k.	73A150
16.587	**Ubiquinone 30**							
	$(CH_3)_2\dot{C}OH + UQ \rightarrow CH_3COCH_3 + H^+ + UQ^{\bullet-}$	1.9×10^9	7			p.r.	P.b.k. in soln. contg. 7 mol L^{-1} 2-PrOH and 1 mol L^{-1} acetone.	730125
16.588	**Vitamin K_1**							
	$(CH_3)_2\dot{C}OH + 2\text{-Me(3-phytyl)NQ} \rightarrow CH_3COCH_3 + Me(phytyl)NQ^{\bullet-} + H^+$	1.7×10^9	7			p.r.	P.b.k. in soln. contg. 5 mol L^{-1} 2-PrOH and 2 mol L^{-1} acetone.	730125
16.589	**1,1′-[*o*-Xylylene(1-methyl-4,4′-bipyridinium)]**							
	$(CH_3)_2\dot{C}OH + DV^{4+} \rightarrow [DV]^{\bullet 3+} + CH_3COCH_3 + H^+$	3.5×10^9	7			p.r.	P.b.k. at 605 nm in N_2-satd. soln. contg. 1% 2-PrOH and (0-4) $\times 10^{-4}$ mol L^{-1} viologen.	85A301
16.590	**1,1′-[*m*-Xylylene(1-methyl-4,4′-bipyridinium)]**							
	$(CH_3)_2\dot{C}OH + DV^{4+} \rightarrow [DV]^{\bullet 3+} + CH_3COCH_3 + H^+$	3.3×10^9	7			p.r.	P.b.k. at 605 nm in N_2-satd. soln. contg. 1% 2-PrOH and (0-4) $\times 10^{-4}$ mol L^{-1} viologen.	85A301
16.591	**1,1′-[*p*-Xylylene(1-methyl-4,4′-bipyridinium)]**							
	$(CH_3)_2\dot{C}OH + DV^{4+} \rightarrow [DV]^{\bullet 3+} + CH_3COCH_3 + H^+$	2.9×10^9	7			p.r.	P.b.k. at 605 nm in N_2-satd. soln. contg. 1% 2-PrOH and (0-4) $\times 10^{-4}$ mol L^{-1} viologen.	85A301
16.592	**1,1′-*o*-Xylylenebis(4,4′-bipyridinium)**							
	$(CH_3)_2\dot{C}OH + DV^{4+} \rightarrow CH_3COCH_3 + H^+ + [DV]^{\bullet 3+}$	3.6×10^9	7			p.r.	P.b.k. at 605 nm in N_2-satd. soln. contg. 1% 2-PrOH and (0-4) $\times 10^{-4}$ mol L^{-1} viologen.	85A301

TABLE 16. 1-Hydroxy-1-methylethyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T (K)	Method	Comment	Ref.
16.593	**Cytochrome C**							
	$(CH_3)_2\dot{C}OH + Cyt\ C\ (Fe^{3+}) \rightarrow CH_3COCH_3 + H^+ + Cyt\ C\ (Fe^{2+})$	3.9×10^8	8.0-8.5			p.r.	Abs. changes at 550 nm in soln. contg. 0.1 mol L^{-1} 2-PrOH.	89R257
		2.6×10^8	7.2			p.r.	P.b.k. at 550 nm in soln. contg. 0.2 mol L^{-1} 2-PrOH, (0.005-0.01) mol L^{-1} acetone and 6 mg L^{-1} catalase; rel. to $k((CH_3)_2\dot{C}OH + (CH_3)_2\dot{C}OH) = 2 \times 10^9$ L mol^{-1} s^{-1}.	82A156
		3.8×10^8 1.6×10^8	7 9.3			p.r.	P.b.k. at 550 nm; radical from 2-PrOH.	751012
16.594	**Deoxyribonucleic acid**							
	$(CH_3)_2\dot{C}OH + DNA \rightarrow$	7.4×10^3	9.2			γ-r.	Calcd. from inactivation efficiency in N_2O-satd. soln. contg. 10^{-4} mol L^{-1} $MgCl_2$, 10^{-3} mol L^{-1} Na tetraborate, and 2-PrOH.	88R099 83R032
16.595	**Methemoglobin**							
	$(CH_3)_2\dot{C}OH + Fe^{3+}$ Hb $\rightarrow CH_3COCH_3 + H^+ + Fe^{2+}$ Hb	2.4×10^8	7.2			p.r.	P.b.k. at 555 nm in soln. contg. 0.2 mol L^{-1} 2-PrOH, (0.005-0.01) mol L^{-1} acetone and 6 mg L^{-1} catalase; rel. to $k((CH_3)_2\dot{C}OH + (CH_3)_2\dot{C}OH) = 2 \times 10^9$ L mol^{-1} s^{-1}.	82A156
16.596	**Metmyoglobin**							
	$(CH_3)_2\dot{C}OH + Fe^{3+}$Mb $\rightarrow CH_3COCH_3 + H^+ + Fe^{2+}$Mb	$\sim 1 \times 10^8$	7.5			p.r.	P.b.k.	79A371

TABLE 17. 2-Hydroxy-2,2-dimethylethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
17.1	**2-Hydroxy-2,2-dimethylethyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + {}^{\bullet}CH_2C(CH_3)_2OH \rightarrow (CH_3)_2C(OH)CH_2CH_2C(CH_3)_2OH$	6×10^8	6		294	p.r.	D.k. at 227 nm in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH; $\varepsilon = 960\ L\ mol^{-1}\ cm^{-1}$	92A447
		7×10^8	6			p.r.	D.k. in N_2O-satd. soln. contg. *tert*-BuOH; ε = 900, 200 and 30 $L\ mol^{-1}cm^{-1}$ at 225, 250 and 280 nm, resp.; $2k/\varepsilon = 1.3\times10^7$ and 1.1×10^7 cm s^{-1} at pH 6 and 13.5, resp.	690419
		6×10^8	13.5					
17.2	**Disilver monocation**							
	$^{\bullet}CH_2C(CH_3)_2OH + Ag_2^{+} \rightarrow Ag^+ + Ag^+ + OH^- + CH_2{=}C(CH_3)_2$	2.0×10^9				p.r.	Calcd. from best fit for increase in condy. as function of time in soln. contg. 0.1 mol L^{-1} *tert*-BuOH and 5×10^{-4} mol L^{-1} $AgClO_4$.	78A410
17.3	**Silver(I) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Ag^+ \rightarrow$					p.r.	No reaction to give Ag^0 in soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	78A410
17.4	**Bismuth(III) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Bi^{3+} \rightarrow BiCH_2C(CH_3)_2OH^{3+}$	4×10^6	<0			p.r.	P.b.k. at ~400 nm in Ar-satd. soln. contg. 5 mol L^{-1} $HClO_4$ and *tert*-BuOH.	88A493
17.5	**Bromine**							
	$^{\bullet}CH_2C(CH_3)_2OH + Br_2 \rightarrow BrCH_2C(CH_3)_2OH + Br^{\bullet}$	2.5×10^9	~4		296	p.r.	P.b.k. at 360 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} Br^-, $(5\text{-}30)\times10^{-5}$ mol L^{-1} Br_2 and 1 mol L^{-1} *tert*-BuOH.	93A156
17.6	**Cadmium(I) ions**							
	$^{\bullet}CH_2C(CH_3)_2OH + Cd^+ \rightarrow Cd^{2+} + CH_2{=}C(CH_3)_2 + OH^-$	$\sim1\times10^9$				p.r.	Calcd. from opt. and condy. studies in soln. contg. *tert*-BuOH and Cd^{2+}.	751064
17.7	**Cadmium dimer dication**							
	$^{\bullet}CH_2C(CH_3)_2OH + Cd_2^{2+} \rightarrow OH^- + Cd^+ + CH_2{=}C(CH_3)_2 + Cd^{2+}$	$\sim1\times10^9$				p.r.	Calcd. from opt. and condy. studies in soln. contg. *tert*-BuOH and Cd^{2+}.	751064
17.8	**Cadmium(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Cd^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in Cd^+ in soln. contg. 0.1 mol L^{-1} Cd^{2+} upon addn. of 0.1 mol L^{-1} *tert*-BuOH.	751027
		$<2.5\times10^5$				p.r.	No reaction obs.	751153
17.9	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(I) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH +$ *N-rac*-Co(4,11-dieneN$_4$)$^+$ $\rightarrow$	2×10^8	7		298	p.r.	D.k. in soln. contg. $H_2PO_4^{2-}$ and 0.5 mol L^{-1} *tert*-BuOH.	91A513
17.10	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(I) ion, protonated**							
	$^{\bullet}CH_2C(CH_3)_2OH +$ *N-rac*-Co(4,11-dieneN$_4$)(H)$^{2+}$ $\rightarrow$ *tert*-BuOH + *N-rac*-Co(4,11-dieneN$_4$)$^{2+}$	2×10^8	7		298	p.r.	D.k. in soln. contg. $H_2PO_4^{2-}$ and 0.5 mol L^{-1} *tert*-BuOH.	91A513
17.11	**Cobalt(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Co^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in Co^+ in soln. contg. 0.1 mol L^{-1} Co^{2+} upon addn. of 0.1 mol L^{-1} *tert*-BuOH.	751027
17.12	***N-meso*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH +$ *N-meso*-Co(4,11-dieneN$_4$)$^{2+}$ $\rightarrow$ *N-meso*-HOC(CH$_3$)$_2$CH$_2$Co(4,11-dieneN$_4$)$^{2+}$	2×10^7	7		298	p.r.	D.k. in N_2-satd. soln. contg. 0-0.25 mol L^{-1} *tert*-BuOH and $(0.05\text{-}1.8)\times10^{-3}$ mol L^{-1} *N-meso*-Co(4,11-dieneN$_4$)$^{2+}$.	91A513

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
17.13	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + *N-rac*-Co(4,11-dieneN$_4$)$^{2+}$ → *N-rac*-HOC(CH$_3$)$_2$CH$_2$Co(4,11-dieneN$_4$)$^{2+}$	1.4×10^6	7		298	p.r.	D.k. in N_2-satd. soln. contg. 0-0.25 mol L^{-1} *tert*-BuOH and $(0.05\text{-}1.8) \times 10^{-3}$ mol L^{-1} *N-rac*-Co(4,11-dieneN$_4$)$^{2+}$.	91A513
		$<1 \times 10^7$				p.r.	No reaction obs.	78A200
17.14	**Nitrilotriacetatocobaltate(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + CoNTA$^-$ → HOC(CH$_3$)$_2$CH$_2$CoNTA$^-$	1.1×10^7	7			p.r.	P.b.k. at 330 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} *tert*-BuOH.	79A255
17.15	**3,10,17,24-Tetrasulfophthalocyaninecobaltate(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + Co(tspc)$^{4-}$ → *HOC(CH$_3$)$_2$CH$_2$Co(tspc)*$^{4-}$	4.5×10^9	3-12			p.r.	P.b.k. in N_2O-satd. soln. contg. *tert*-BuOH; monomer and dimer reactions not differentiated.	83A238
		1×10^8				p.r.	P.b.k. at 675 nm in N_2O-satd. soln. contg. *tert*-BuOH. Reaction of aggregated Co(tspc)$^{4-}$. Rate constant for monomer is higher (monomerized by high alcohol concn.).	82A433
		2.2×10^8	9			p.r.	P.b.k. at 440 nm in N_2O-satd. soln. contg. 0.1-0.2 mol L^{-1} *tert*-BuOH; mechanism suggested to involve addn. to the dimer [Co(tspc)]$_2^{8-}$ followed by splitting to the monomeric product.	80A146
17.16	**Cobal(II)amin**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + B12r → B12a	2.4×10^8	5			p.r.	P.b.k. at 350-60 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	751169
17.17	**Chromium(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + Cr^{2+} → $CrCH_2C(CH_3)_2OH^{2+}$	1.0×10^8	~3		293	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and *tert*-BuOH; $\Delta V^{\ddagger} = 3.4$ cm^3 mol^{-1} studied at 0.1-150 MPa.	92A361
		1.0×10^8	~1			p.r.	P.b.k. in Ar-satd. soln. contg. *tert*-BuOH and $HClO_4$.	741146
17.18	**Chromium(III) mesoporphyrin**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + Cr^{III}MP → addn.	$\sim 1 \times 10^{10}$				p.r.	P.b.k.in deoxygenated soln. contg. *tert*-BuOH.	92G079
17.19	**Copper(I) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + Cu^+ → $CuCH_2C(CH_3)_2OH^+$	4.5×10^9	2.7-4.5			p.r.	P.b.k. in N_2O-satd. soln. contg. $(5\text{-}20) \times 10^{-4}$ mol L^{-1} $CuSO_4$, $(5\text{-}30) \times 10^{-5}$ mol L^{-1} Cu^+, $(5\text{-}30) \times 10^{-5}$ mol L^{-1} Cr^{III}, and 0.1-1 mol L^{-1} *tert*-BuOH.	88A410
		2.6×10^{10}	4.5			p.r.	Estd. from p.b.k. at 400 nm in N_2O-satd. soln. contg. *tert*-BuOH and Cu^{2+}; final products are Cu^{2+} and isobutene.	78A322
17.20	**Ethylene-copper(I) complex**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + $CuC_2H_4^+$ → $H_2C{=}CH_2$ + $CH_2{=}C(CH_3)_2$ + Cu^{2+} + OH^-	5.3×10^7	4.5				Estd. from effect of $[C_2H_4]$ on rate of formn. and decay of Cu(ethylene)$^+$ at 227 nm in soln. contg. *tert*-BuOH.	78A322
17.21	**Bis(1,10-phenanthroline)copper(I) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + Cu(phen)$_2^+$ → HOC(CH$_3$)$_2$CH$_2$Cu(phen)$_2^+$	$>10^{10}$	7			p.r.	P.b.k. in He-satd. soln. contg. 0.01-1 mol L^{-1} *tert*-BuOH and $(1\text{-}5) \times 10^{-4}$ mol L^{-1} Cu(phen)$_2^+$.	88A392

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
17.22	**Copper(II) ion**							
	$^{\cdot}CH_2C(CH_3)_2OH + Cu^{2+} \rightarrow CuCH_2C(CH_3)_2OH^{2+}$	5×10^6	6			p.r.	P.b.k. in N_2O-satd. soln. contg. (1-5) $\times 10^{-4}$ mol L^{-1} $CuSO_4$ and 0.1 mol L^{-1} *tert*-BuOH.	80A277
		2.7×10^6	4.5			p.r.	P.b.k. at 320 nm ($Cu^{I}CH_2CHCONH_2$) in N_2O-satd. soln. contg. *tert*-BuOH and acrylamide. Product is Cu^+.	78A322
		3.2×10^6	3					
17.23	**Copper(II) triglycine**							
	$^{\cdot}CH_2C(CH_3)_2OH + Cu(Gly_3)^- \rightarrow (Gly_3)CuCH_2C(CH_3)_2OH^-$	2.6×10^7	~7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH.	79A445
17.24	**Copper(II) tetraglycine**							
	$^{\cdot}CH_2C(CH_3)_2OH + Cu(Gly_4)^{2-} \rightarrow (Gly_4)CuCH_2C(CH_3)_2OH^{2-}$	2×10^7	8.1			p.r.	P.b.k. at 320 nm in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH.	80A304
17.25	**Pentacyanonitrosylferrate(II) ion**							
	$^{\cdot}CH_2C(CH_3)_2OH + Fe(CN)_5NO^{3-} \rightarrow [Fe(CN)_5N(O)CH_2C(CH_3)_2OH]^{3-}$	2.5×10^9	6.0-7.5			p.r.	D.k. at 380 nm, as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *tert*-BuOH and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
17.26	**Ethylenediaminetetraacetatoferrate(II) ion**							
	$^{\cdot}CH_2C(CH_3)_2OH + FeEDTA^{2-} \rightarrow CH_2{=}C(CH_3)_2 + OH^- + FeEDTA^-$	~2×10^6	7		296	chem.	Esr study in soln. contg. Fe(II), EDTA, H_2O_2 and *tert*-BuOH.	92D262
17.27	**Tris(1,10-phenanthroline)iron(III) ion**							
	$^{\cdot}CH_2C(CH_3)_2OH + Fe(phen)_3^{3+} \rightarrow Fe(phen)_3^{2+}$ + other prod.	1.5×10^7	~1			p.r.	P.b.k. at 490 nm in soln. contg. *tert*-BuOH; faster reactions assigned to H and OH + complex.	85A284
		~10^7	acid			p.r.	P.b.k. in soln. contg. *tert*-BuOH, H_2SO_4 and $HClO_4$; slower process follows fast H reaction.	79A174
17.28	**Mercury(I) cyanide**							
	$^{\cdot}CH_2C(CH_3)_2OH + HgCN \rightarrow$	1.6×10^9				p.r.	Calcd. from increase in decay rate at 285 nm in soln. contg. *tert*-BuOH and $Hg(CN)_2$; used $2k$(HgCN + HgCN) = 3.4×10^9 L mol^{-1} s^{-1}.	751203
17.29	**Hexachloroiridate(IV) ion**							
	$^{\cdot}CH_2C(CH_3)_2OH + IrCl_6^{2-} \rightarrow IrCl_5^{2-} + ClCH_2C(CH_3)_2OH$	1.2×10^9	4-6		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. *tert*-BuOH.	82A041
17.30	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(II) ion**							
	$^{\cdot}CH_2C(CH_3)_2OH + MnTPPS^{4-} \rightarrow HOC(CH_3)_2CH_2MnTPPS^{4-}$	~9.5×10^8	8.8		295	p.r.	P.b.k. in soln. contg. *tert*-BuOH.	92A391
		~9.5×10^8	9.4, 12.6			p.r.	D.k. as well as p.b.k.	84A120
17.31	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(II) ion**							
	$^{\cdot}CH_2C(CH_3)_2OH + MnTMpyP^{4+} \rightarrow HOC(CH_3)_2CH_2MnTMpyP^{4+}$	~1.8×10^9	9.0			p.r.	D.k. as well as p.b.k.	84A120
17.32	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion**							
	$^{\cdot}CH_2C(CH_3)_2OH + MnTMpyP^{5+} \rightarrow MnTMpyP^{4+}$ + other prod.	4×10^4	6.7-9.3			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
17.33	**5,10,15,20-Tetrakis[4-(*N,N,N*-trimethylammonio)phenyl]porphinatomanganese(III) ion**							
	$^{\cdot}CH_2C(CH_3)_2OH + MnTAPP^{5+} \rightarrow MnTAPP^{4+}$ + other prod.	5.0×10^4	6.7			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
17.34	**α,α,α,β-Tetrakis[2-(*N*-methylisonicotinamido)phenyl]porphinatomanganese(III) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + MnPFP^{5+} \rightarrow MnPFP^{4+}$ + other prod.	1.6×10^5	7.0			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm.	86A313
17.35	**Nickel(I) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Ni^+ \rightarrow Ni^{2+} + CH_2{=}C(CH_3)_2 + OH^-$	3×10^9				p.r.	D.k. at 300 nm (Ni^+) in soln. contg. $NiSO_4$ and *tert*-BuOH; assumed $G(Ni^+) = G(R) = 2.7$.	741037
17.36	**Nickel(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Ni^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in Ni^+ in soln. contg. 0.1 mol L^{-1} Ni^{2+} on addn. of 0.1 mol L^{-1} *tert*-BuOH.	751027
17.37	**Oxygen**							
	$^{\bullet}CH_2C(CH_3)_2OH + O_2 \rightarrow (CH_3)_2C(OH)CH_2OO^{\bullet}$	1.4×10^9	6		295	p.r.	P.b.k. at 320 nm in O_2-satd. soln. contg. *tert*-BuOH.	92A447
		1.8×10^9				p.r.	P.b.k. at 260 nm in soln. contg. *tert*-BuOH and various $[O_2]$.	90F447
17.38	***trans*-Dihydroxybis(ethylenediamine)platinum(IV) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH +$ *trans*-$Pt(en)_2(OH)_2^{2+} \rightarrow$	$<2 \times 10^7$	3.9-9.2			p.r.	No reaction obs. in soln. contg. 1 mol L^{-1} *tert*-BuOH and (1 or 2.5) $\times 10^{-4}$ mol L^{-1} $Pt(en)(OH)_2^{2+}$.	80A286
17.39	**Hexachloroplatinate(IV) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + PtCl_6^{2-} \rightarrow PtCl_2(OH)_2^- + Cl^- + H^+ + ClCH_2C(CH_3)_2OH$	6.1×10^7	4.3			p.r.	P.b.k. at 370-460 nm in N_2O-satd. soln. contg. 0.11 or 0.51 mol L^{-1} *tert*-BuOH, and 2 $\times 10^{-3}$ or 6.2×10^{-3} mol L^{-1} $PtCl_6^{2-}$; condy. increase gave $k = 6.0 \times 10^7$ L mol^{-1} s^{-1}.	89A203
17.40	**Pentaamminenitrosylruthenium(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Ru(NH_3)_5NO^{2+} \rightarrow Ru(NH_3)_5N(O)CH_2C(CH_3)_2OH^{2+}$	3.7×10^9	6.0-7.5			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *tert*-BuOH and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
17.41	**Tris(2,2'-bipyridine)ruthenium(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Ru(bpy)_3^{2+} \rightarrow$	$<10^6$	7			p.r.	P.b.k.; no reduction obs.	78A068
17.42	**Tris(2,2'-bipyridine)ruthenium(III) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Ru(bpy)_3^{3+} \rightarrow Ru(bpy)_3^{2+}$	1.9×10^8	4.6			p.r.	P.b.k. in N_2O-satd. soln. contg. *tert*-BuOH.	78A070
		1.3×10^8	acid			p.r.		720462
17.43	**Decaamminebis(2,2'-bipyridine)bis[μ-(cyano)]triruthenium(III),(II),(III) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + [3,2,3] \rightarrow$	$<1 \times 10^6$	2			p.r.	No reaction obs. in 0.5 mol L^{-1} *tert*-BuOH; redn. to $[3,2,3]^{\cdots}$ obs. in γ-radiolysis.	89A024
17.44	**Hydrogen sulfide**							
	$^{\bullet}CH_2C(CH_3)_2OH + H_2S \rightarrow H_2SCH_2C(CH_3)_2OH$	2.0×10^5	7			p.r.	P.b.k. at 380 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH and (0.5-2) $\times 10^{-3}$ mol L^{-1} H_2S; $K = 8.5 \times 10^2$ L mol^{-1}; Products are $HS^{\bullet}$ + *tert*-BuOH.	87A082
			6			p.r.	Effect of $[H_2S]$ on p.b.k. at 380 nm; k(complex → *tert*-BuOH + $^{\bullet}SH$) = 1.3×10^5 s^{-1}.	670262
17.45	**Peroxodisulfate ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + S_2O_8^{2-} \rightarrow$	$<10^4$			~293	chem.	Esr; soln. contg. 0.008 mol L^{-1} Ti(III), 0.01 mol L^{-1} H_2O_2, (0-0.025) mol L^{-1} $S_2O_8^{2-}$ and ~0.01 mol L^{-1} *tert*-BuOH.	84D044

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
17.46	**Uranium(III) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + U^{3+} \rightarrow$	$\leq 5 \times 10^6$	0.3			p.r.	D.k. at 355 nm in He-satd. soln. contg. 0.5 mol L^{-1} $HClO_4$ and 0.9 mol L^{-1} *tert*-BuOH; no reaction obs.	85A122
17.47	**Zinc(I) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Zn^+ + H^+ \rightarrow Zn^{2+} +$ *tert*-BuOH	1.0×10^9	7		295	p.r.	Calcd. from d.k. at 310 nm (Zn^+) in *tert*-BuOH-$ZnSO_4$ soln. assuming $k(H + H) = 1.3 \times 10^{10}$, $k(Zn^+ + Zn^+) = 4 \times 10^8$, $k(R + R) = 6.5 \times 10^8$ and $k(Zn^+ + H) = 2.8 \times 10^9$ L mol^{-1} s^{-1}.	771011
17.48	**Zinc(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + Zn^{2+} \rightarrow$	$<10^6$				p.r.	Estd. from lack of increase in Zn^+ in soln. contg. 0.1 mol L^{-1} Zn^{2+} upon addn. of 0.1 mol L^{-1} *tert*-BuOH.	751027
17.49	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2OH + ZnTPPS^{4-} \rightarrow$	$<10^7$	7			p.r.	P.b.k. in N_2O-satd. soln. contg. *tert*-BuOH.	82A279
17.50	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion, triplet state**							
	$^{\bullet}CH_2C(CH_3)_2OH + {}^3(ZnTPPS^{4-})^* \rightarrow$ addn.	1.8×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. *tert*-BuOH; triplet produced by photolysis.	82A279
17.51	**Acrylamide**							
	$^{\bullet}CH_2C(CH_3)_2OH + H_2C{=}CHCONH_2 \rightarrow$ addn.	4.5×10^7 6.8×10^7	4.5 3			p.r.	C.k. in N_2O-satd. soln. contg. *tert*-BuOH and Cu^{2+}; rel. to $k(^{\bullet}CH_2C(CH_3)_2OH + Cu^{2+}) =$ 2.7×10^6 and 3.2×10^6 L mol^{-1} s^{-1} at pH 4.5 and 3, resp.	78A322
17.52	**4-Aminophenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + 4\text{-}H_2NC_6H_4O^{\bullet} \rightarrow$ addn.	3.9×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 4-aminophenol.	93A306
17.53	**2,2'-Bipyridine H-adduct, conjugate monoacid**							
	$^{\bullet}CH_2C(CH_3)_2OH + [bpyH_2]^{\bullet+} \rightarrow$	1.1×10^9	1			p.r.	D.k. at 365 nm in Ar-satd. soln. contg. 0.1 mol L^{-1} 2-PrOH, 0.25 mol L^{-1} *tert*-BuOH and $HClO_4$ and 5×10^{-4} mol L^{-1} $bpyH^+$; radical-radical reaction.	85A184
17.54	**4,4'-Bipyridine H-adduct, conjugate monoacid**							
	$^{\bullet}CH_2C(CH_3)_2OH + [4,4'\text{-}bpyH_2]^{\bullet+} \rightarrow$	$\sim 1.3 \times 10^9$	1			p.r.	D.k. at 375 nm in Ar-satd. soln. contg. 0.2 mol L^{-1} *tert*-BuOH and 4×10^{-4} mol L^{-1} 4,4'-$bpyH_2^{2+}$.	84A325
17.55	***N*-Bromosuccinimide**							
	$^{\bullet}CH_2C(CH_3)_2OH + SBr \rightarrow$ $BrCH_2C(CH_3)_2OH + S^{\bullet}$	1.5×10^8			296	p.r.	P.b.k. at 270 nm in N_2O-satd. soln. contg. $(5\text{-}40) \times 10^{-4}$ mol L^{-1} SBr, 10^{-4} mol L^{-1} Ag^+ and 0.01 mol L^{-1} *tert*-BuOH.	93A156
		2×10^8			296	p.r.	C.k. in soln. contg. $[O_2]/[SBr] = 0$ to 0.25 and 1 mol L^{-1} *tert*-BuOH; rel. to $k(^{\bullet}CH_2C(CH_3)_2OH + O_2) = 3 \times 10^9$ L mol^{-1} s^{-1}.	93A156
17.56	**4-(*tert*-Butyl)phenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + 4\text{-}(CH_3)_3CC_6H_4O^{\bullet}$ $\rightarrow$ addn.	6.0×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 4-*tert*-butylphenol.	93A306
17.57	**3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy**							
	$^{\bullet}CH_2C(CH_3)_2OH + NX\text{-}s \rightarrow$	1.8×10^8	acid			p.r.	Condy. change in N_2O-satd. soln. contg. 0.01-0.1 mol L^{-1} *tert*-BuOH; addn. reaction.	761152

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
17.58	**3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + NX-u →	2.0×10^8	acid			p.r.	Condy. change in N_2O-satd. soln. contg. 0.01-0.1 mol L^{-1} *tert*-BuOH; addn. reaction.	761152
17.59	**4-Carboxy-2,6-dimethoxyphenoxyl, anion**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + 4-$^{-}O_2C$-2,6-$(CH_3O)_2C_6H_2O^{\bullet}$ → addn.	2.5×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 4-carboxy-2,6-dimethylphenol.	93A306
17.60	**2-Carboxy-2,5,7,8-tetramethyl-6-chromanoxy**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + HTxO$^{\bullet}$ → addn.	1.5×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and Trolox C anion.	93A306
17.61	**Chlorpromazine, conjugate acid**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + CZH^+ →	$<10^6$	7			p.r.	No bleaching of solute on ms time-scale in N_2O-satd. soln. contg. *tert*-BuOH.	83A272
17.62	**4-Cyanophenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + 4-$CNC_6H_4O^{\bullet}$ → addn.	1.0×10^9	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 4-cyanophenol.	93A306
17.63	**Cysteamine**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + $H_3N^+CH_2CH_2S^-$ → *tert*-BuOH + $H_2NCH_2CH_2S^{\bullet}$	1.8×10^7				p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O- satd. soln. contg. *tert*-BuOH.	680132
17.64	**Cysteine**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + CysSH → CysS$^{\bullet}$ + *tert*-BuOH	3×10^7				p.r.	P.b.k. at 410 nm in deaerated soln. contg. cysteine and *tert*-BuOH.	89A096
17.65	**1,6-Diazabicyclo[4.4.4]tetradecane radical cation**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + $DABCT^{\bullet+}$ →	6.8×10^8	~4			p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol *tert*-BuOH and $(0.2\text{-}10) \times 10^{-4}$ mol L^{-1} radical cation.	86A272
		$\sim 2 \times 10^9$				p.r.	D.k. in N_2-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	80A022
17.66	**1,5-Diazabicyclo[3.3.3]undecane radical cation**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + $[3.3.3]^{\bullet+}$ →	$\sim 2 \times 10^9$				p.r.	D.k. in N_2-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	80A022
17.67	**(*E*)-4,5-Dihydroxy-1,2-dithiane**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + $[SSCH_2(CHOH)_2CH_2]$ →	$<10^6$	10.8			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} *tert*-BuOH.	86A363
17.68	**1,1'-Dimethyl-4,4'-bipyridinium**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + MV^{2+} → $MVH^{\bullet 2+}$ + other prod.	1×10^7	1			p.r.	Computer simulation based on abs. at 390 and 595 nm in air-free soln. contg. $(1\text{-}4) \times 10^{-4}$ mol L^{-1} MV^{2+} and $(4\text{-}16) \times 10^{-2}$ mol L^{-1} *tert*-BuOH.	82A216
17.69	**1,6-Dimethyl-1,6-diazacyclo[4.4]decane radical cation**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + $[4.4]^{\bullet+}$ →	$\sim 2 \times 10^9$				p.r.	D.k. in N_2-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	80A022
17.70	**1,3-Dimethyllumichrome**							
	$^{\bullet}CH_2C(CH_3)_2OH$ + Fl →	2.5×10^9	5-10			p.r.	P.b.k. in N_2O-satd. soln. contg. *tert*-BuOH.	82B104

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
17.71	**Dithiothreitol**							
	$^{\bullet}CH_2C(CH_3)_2OH + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\bullet} + tert\text{-BuOH}$	4.7×10^7	7.4			p.r.	P.b.k. at 390-400 nm in N_2O-satd. soln. contg. dithiothreitol and *tert*-BuOH; also see [87G007].	87A250
		6.8×10^7	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH.	731020
17.72	***N*-Ethylmaleimide**							
	$^{\bullet}CH_2C(CH_3)_2OH + NEM \rightarrow$ addn.					p.r.	No *e*-transfer obs.; very low addn. rate.	720144
17.73	**Glutathione**							
	$^{\bullet}CH_2C(CH_3)_2OH + GSH \rightarrow GS^{\bullet} +$ *tert*-BuOH	5.0×10^7			293	p.r.	P.b.k. in N_2O-satd. soln. contg. *tert*-BuOH.	88A144
17.74	**Hydroquinone**							
	$^{\bullet}CH_2C(CH_3)_2OH + QH_2 \rightarrow$	$\leq 2 \times 10^6$	11.5			p.r.	Semiquinone not formed in soln. contg. *tert*-BuOH.	79A051
17.75	**Iodoacetic acid**							
	$^{\bullet}CH_2C(CH_3)_2OH + ICH_2CO_2H \rightarrow ICH_2C(CH_3)_2OH + {}^{\bullet}CH_2CO_2H$	$\sim 1 \times 10^7$	1		293	chem.	Estd. from esr meas. in Ti^{III}-H_2O_2 soln. contg. *tert*-BuOH; used $2k(^{\bullet}CH_2CO_2H + {}^{\bullet}CH_2CO_2H) = 1.8 \times 10^9$ L mol^{-1} s^{-1}.	745286
17.76	**Iodoacetonitrile**							
	$^{\bullet}CH_2C(CH_3)_2OH + ICH_2CN \rightarrow ICH_2C(CH_3)_2OH + {}^{\bullet}CH_2CN$	$\sim 2 \times 10^7$	1		293	chem.	Estd. from esr meas. in Ti^{III}-H_2O_2 soln. contg. *tert*-BuOH; used $2k(^{\bullet}CH_2CN + {}^{\bullet}CH_2CN) = 2 \times 10^9$ L mol^{-1} s^{-1}.	745286
17.77	**2-Iodoethanol**							
	$^{\bullet}CH_2C(CH_3)_2OH + ICH_2CH_2OH \rightarrow ICH_2C(CH_3)_2OH + {}^{\bullet}CH_2CH_2OH$	$\sim 2 \times 10^5$	1		293	chem.	Estd. from esr meas in Ti^{III}-H_2O_2 soln. contg. *tert*-BuOH; used $2k(^{\bullet}CH_2CH_2OH + {}^{\bullet}CH_2CH_2OH) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	745286
17.78	**3-Iodopropionic acid**							
	$^{\bullet}CH_2C(CH_3)_2OH + ICH_2CH_2CO_2H \rightarrow ICH_2C(CH_3)_2OH + {}^{\bullet}CH_2CH_2CO_2H$	$\sim 2 \times 10^5$	1		293	chem.	Estd. from esr meas. in Ti^{III}-H_2O_2 soln. contg. *tert*-BuOH; used $2k(^{\bullet}CH_2CH_2CO_2H + {}^{\bullet}CH_2CH_2CO_2H) = 2.4 \times 10^9$ L mol^{-1} s^{-1}.	745286
17.79	**Lipoamide**							
	$^{\bullet}CH_2C(CH_3)_2OH + LS_2 \rightarrow$	$\sim 10^7$	10.8			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} *tert*-BuOH.	86A363
17.80	**Lumiflavine**							
	$^{\bullet}CH_2C(CH_3)_2OH + LF \rightarrow$	4×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. *tert*-BuOH and lumiflavine; gave spectrum with λ_{max} = 560 nm.	86A457
17.81	**2-Mercaptoethanol**							
	$^{\bullet}CH_2C(CH_3)_2OH + HSCH_2CH_2OH \rightarrow$ *tert*-BuOH + $^{\bullet}SCH_2CH_2OH$	8.2×10^7	10			p.r.	P.b.k. at 420 nm ($RSSR^-$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	690553
17.82	**2-Methoxy-4-methylphenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH +$ 4-CH_3-2-$CH_3OC_6H_3O^{\bullet}$ → addn.	3.3×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 2-methoxy-4-methylphenol.	93A306
17.83	**4-Methoxyphenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + 4\text{-}CH_3OC_6H_4O^{\bullet} \rightarrow$ addn.	5.0×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 4-methoxyphenol.	93A306

TABLE 17. 2-Hydroxy-2,2-dimethylethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
17.84	**2-Methyl-2-nitrosopropane**							
	$^{\bullet}CH_2C(CH_3)_2OH + (CH_3)_3CNO \rightarrow$ addn.	$<1 \times 10^6$	~7		~291	p.r.	P.b.k. (est) in unbuffered N_2O-satd. soln. contg. 0.25 mol L^{-1} *tert*-BuOH and (0.25-15) $\times 10^{-3}$ mol L^{-1} *MNP* (assuming complete dimer dissociation).	91D097
17.85	**4-Methylphenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + 4\text{-}CH_3C_6H_4O^{\bullet} \rightarrow$ addn.	5.6×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 4-methylphenol.	93A306
17.86	**Norpseudopelletierine *N*-oxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + NPPN \rightarrow$	5.1×10^8				p.r.	D.k. at 240 nm in N_2O-satd. soln. contg. *tert*-BuOH.	71006I
17.87	**Promethazine, conjugate acid**							
	$^{\bullet}CH_2C(CH_3)_2OH + PZH^+ \rightarrow$	$<10^6$	7			p.r.	No bleaching of solute on ms time-scale in N_2O-satd. soln. contg. *tert*-BuOH.	83A272
17.88	**2,2,6,6-Tetramethylpiperidine-*N*-oxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + TMPN \rightarrow$ addn.	1.5×10^8	2.6			p.r.	Condy. change in N_2O-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	76I067
17.89	**2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + TAN \rightarrow$ addn.	2.8×10^8	2.4			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} *tert* BuOH.	76I067
17.90	**Thionine cation**							
	$^{\bullet}CH_2C(CH_3)_2OH + Th^+ \rightarrow$		6.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH and 10^{-4} mol L^{-1} thionine; no reaction obs.	87A451
17.91	**Toluidine Blue cation**							
	$^{\bullet}CH_2C(CH_3)_2OH + TB^+ \rightarrow$		6.8			p.r.	N_2O-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH; no reaction obs.	89A262
17.92	**2,4,6-Tribromophenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + 2,4,6\text{-}Br_3C_6H_2O^{\bullet} \rightarrow$ addn.	5.6×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 2,4,6-tribromophenol.	93A306
17.93	**2,4,6-Trichlorophenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + 2,4,6\text{-}Cl_3C_6H_2O^{\bullet} \rightarrow$ addn.	5.2×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 2,4,6-trichlorophenol.	93A306
17.94	**2,4,6-Triiodophenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + 2,4,6\text{-}I_3C_6H_2O^{\bullet} \rightarrow$ addn.	1.5×10^9	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 2,4,6-triiodophenol.	93A306
17.95	**2,4,6-Trimethylphenoxyl**							
	$^{\bullet}CH_2C(CH_3)_2OH + 2,4,6\text{-}Me_3C_6H_2O^{\bullet} \rightarrow$ addn.	4.3×10^8	9.2			p.r.	D.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.01 mol L^{-1} NaN_3 and 2,4,6-trimethylphenol.	93A306
17.96	**Cytochrome C**							
	$^{\bullet}CH_2C(CH_3)_2OH + Cyt\ C\ (Fe^{3+}) \rightarrow$					p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} *tert*-BuOH; no reaction obs.	78A288
17.97	**Laccase**							
	$^{\bullet}CH_2C(CH_3)_2OH + Cu\text{-}OXD \rightarrow$ addn.	$\sim 10^{10}$	6.0			p.r.	P.b.k. (complex formn.)	82A422

TABLE 18. Methoxymethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
18.1	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanecobalt(II) ion**							
	$CH_3O\dot{C}H_2 + Co(Me_6[14]aneN_4)^{2+} \rightarrow CH_3OCH_2Co(Me_6[14]aneN_4)^{2+}$		7		296	f.p.	D.k. at 600 nm in soln. contg. $MV^{\cdot+}$ as indicator and $CH_3OCH_2Co(cyclam)^{2+}$.	89A530
18.2	**Cobal(II)amin**							
	$CH_3O\dot{C}H_2 + B12r \rightarrow$ addn.	5.1×10^8	7		296	f.p.	D.k. at 470 nm, as well as p.b.k. at 520 nm, in soln. contg. $CH_3OCH_2Co(cyclam)^{2+}$ and cobal(II)amin.	89A530
18.3	**Chromium(II) ion**							
	$CH_3O\dot{C}H_2 + Cr^{2+} \rightarrow CrCH_2OCH_3^{2+}$	2.3×10^8	<2		297	f.p.	D.k. at 600 nm in soln. contg. $MV^{\cdot+}$ as indicator and $CH_3OCH_2Co(cyclam)^{2+}$.	89A338
18.4	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$CH_3O\dot{C}H_2 + Cr([15]aneN_4)^{2+} \rightarrow CH_3OCH_2Cr([15]aneN_4)^{2+}$	1.6×10^8			298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\cdot+}$ as indicator and $CH_3OCH_2Co(dmgH)_2$.	91A427
18.5	**Ferricyanide ion**							
	$CH_3O\dot{C}H_2 + Fe(CN)_6^{3-} \rightarrow$	4.3×10^9	4-6			p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. dimethyl ether.	82A041
18.6	**Hexachloroiridate(IV) ion**							
	$CH_3O\dot{C}H_2 + IrCl_6^{2-} \rightarrow IrCl_6^{3-}$	6.5×10^9	4-6			p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. dimethyl ether.	82A041
18.7	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$CH_3O\dot{C}H_2 + \alpha\text{-}Ni(cyclam)^{2+} + H_2O \rightarrow \alpha\text{-}CH_3OCH_2Ni(cyclam)(H_2O)^{2+}$	2.4×10^8	0	6.0	298	f.p.	D.k. at 650 nm in deaerated soln. contg. $ABTS^{\cdot-}$ as indicator and alkylcobalt(III) complex and 6.0 mol L^{-1} $HClO_4$.	91A515
18.8	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$CH_3O\dot{C}H_2 + \beta\text{-}Ni(cyclam)^{2+} + H_2O \rightarrow \beta\text{-}CH_3OCH_2Ni(cyclam)(H_2O)^{2+}$	1.5×10^7	0	1.0	298	f.p.	D.k. at 650 nm in deaerated soln. contg. $ABTS^{\cdot-}$ as indicator, alkylcobalt(III) complex and 1.0 mol L^{-1} $HClO_4$.	91A515
18.9	**Oxygen**							
	$CH_3O\dot{C}H_2 + O_2 \rightarrow CH_3OCH_2OO^{\cdot}$	4.9×10^9	0		298	f.p.	C.k. in soln. contg. 1.0 mol L^{-1} $HClO_4$; alkyl radical from $RCo(dmgH)_2OH_2$ or $RCo(cyclam)H_2O^{2+}$; rel. to $k(^{\cdot}CH_2OCH_3 + \beta\text{-}Ni(cyclam)^{2+}) = 1.5 \times 10^7$ L mol^{-1} s^{-1}.	91A176
18.10	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$CH_3O\dot{C}H_2 + ABTS^{\cdot-} \rightarrow$ addn.	1.8×10^9 1.2×10^9	0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\cdot-}$ (from $ABTS^{2-} + Br_2$), alkylcobalt(III) complex and 1.0 or 6.0 mol L^{-1} $HClO_4$.	91A515
18.11	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$CH_3O\dot{C}H_2 + MV^{\cdot+} \rightarrow$	1.1×10^9			298	f.p.	D.k. at 600 nm in soln. contg. $(1\text{-}8) \times 10^{-5}$ mol L^{-1} $MV^{\cdot+}$ and $CH_3OCH_2Co(dmgH)_2$.	91A427
		1.1×10^9	<2		297	f.p.	D.k. at 600 nm ($MV^{\cdot+}$, $\varepsilon = 1.37 \times 10^4$ L mol^{-1} cm^{-1}, 0.01-0.1 mol L^{-1}); $MV^{\cdot+}$ from Zn/Hg redn. of MV^{2+}; $(2\text{-}4) \times 10^{-6}$ mol L^{-1} radical from photolysis of $CH_3OCH_2Co(cyclam)^{2+}$.	89A338
18.12	**4-Nitroacetophenone**							
	$CH_3O\dot{C}H_2 + PNAP \rightarrow CH_3OCH_2ON(\dot{O})C_6H_4\text{-}4\text{-}COCH_3$	5.0×10^7	5-7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} dimethyl ether; $\Delta H^{\ddagger} = 14.1$ kJ mol^{-1}, $\Delta S^{\ddagger} = -49$ J K^{-1} mol^{-1}, studied at 273-333 K.	88A099

TABLE 18. Methoxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
18.13	**Tetranitromethane**							
	$CH_3O\dot{C}H_2 + C(NO_2)_4 \rightarrow CH_3OCH_2O\dot{N}^+(O^-)C(NO_2)_3$	6×10^9				p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} methyl ether; adduct in equilibrium with $CH_3OCH_2ON(\dot{O})C(NO_2)_3$; adduct decomposes to nitroform anion, $k = 1.1 \times 10^4\ s^{-1}$.	80A071

TABLE 19. 1-Ethoxyethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
19.1	**Diaqua(nitrilotriacetato)cobaltate(II) ion**							
	$CH_3\dot{C}HOC_2H_5 + CoNTA^- \rightarrow C_2H_5OCH(CH_3)CoNTA^-$	4.9×10^7	4-7		298	p.r.	P.b.k. at 260 nm in N_2O-satd. soln. contg. $(1\text{-}50) \times 10^{-4}$ mol L^{-1} $CoNTA^-$ and 0.2-1 mol L^{-1} Et_2O.	88A343
19.2	**Hexaamminecobalt(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Co(NH_3)_6^{3+} \rightarrow$	$\leq 5 \times 10^6$	5.5-6			p.r.	D.k. in N_2O-satd. soln. contg. ethyl ether.	771100
19.3	**Pentaammine(bromo)cobalt(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Co(NH_3)_5Br^{2+} \rightarrow$	1.6×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. ethyl ether.	771100
19.4	**Pentaammine(chloro)cobalt(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Co(NH_3)_5Cl^{2+} \rightarrow$	1.4×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. ethyl ether.	771100
19.5	**Pentaammine(fluoro)cobalt(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Co(NH_3)_5F^{2+} \rightarrow$	1.1×10^6	~1	1.0	298	chem.	C.k., radical from homolysis of $CrCH(CH_3)OC_2H_5^{2+}$; rel. to $k(^{\cdot}CH(CH_3)OC_2H_5 + Co(NH_3)_5Cl^{2+}) = 1.4 \times 10^7$ L mol^{-1} s^{-1}.	83A048
19.6	***trans*-Dibromobis(ethylenediamine)cobalt(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Co(en)_2Br_2^+ \rightarrow$	6.5×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. Et_2O.	771100
19.7	***cis*-Bromobis(ethylenediamine)fluorocobalt(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Co(en)_2BrF^+ \rightarrow$	4.9×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. Et_2O.	771100
19.8	**Bis(ethylenediamine)dichlorocobalt(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Co(en)_2Cl_2^+ \rightarrow$	1.5×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. Et_2O.	771100
19.9	***cis*-Aquachlorobis(ethylenediamine)cobalt(III) ion**							
	$CH_3\dot{C}HOC_2H_5$ + *cis*-$Co(en)_2(H_2O)Cl^{2+} \rightarrow$	3.5×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. Et_2O.	771100
19.10	***cis*-Amminechlorobis(ethylenediamine)cobalt(III) ion**							
	$CH_3\dot{C}HOC_2H_5$ + *cis*-$Co(en)_2(NH_3)Cl^{2+} \rightarrow$	4.6×10^6	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. Et_2O.	771100
19.11	**Aquabis(dimethylglyoximato)methylcobalt(III)**							
	$CH_3\dot{C}HOC_2H_5 + CH_3Co(dmgH)_2(H_2O) \rightarrow CH_3CH(CH_3)OC_2H_5 + Co(dmgH)_2(H_2O)_2$	1.4×10^6	acid	1.0	298	chem.	C.k.; radical from homolysis of $CrCH(CH_3)OC_2H_5^{2+}$; rel. to $k(^{\cdot}CH(CH_3)OC_2H_5 + Co(NH_3)_5F^{2+}) = 1.1 \times 10^6$ L mol^{-1} s^{-1}.	86M354
19.12	**Aquabis[dimethylglyoximato]methylcobalt(III), protonated**							
	$CH_3\dot{C}HOC_2H_5 + CH_3Co(dmg_2H_3)(H_2O)^+ \rightarrow CH_3CH(CH_3)OC_2H_5 + Co(dmg_2H_3)(H_2O)_2^+$	1.8×10^6	acid	1.0	298	chem.	C.k.; radical from homolysis of $CrCH(CH_3)OC_2H_5^{2+}$; $[H^+] = 0.15\text{-}1.0$ mol L^{-1}; rel. to $k(^{\cdot}CH(CH_3)OC_2H_5 + Co(NH_3)_5F^{2+}) = 1.1 \times 10^6$ L mol^{-1} s^{-1}.	86M354
19.13	**Aquabis(dimethylglyoximato)ethylcobalt(III)**							
	$CH_3\dot{C}HOC_2H_5 + CH_3CH_2Co(dmgH)_2(H_2O) \rightarrow CH_3CH_2CH(CH_3)OC_2H_5 + Co(dmgH)_2(H_2O)_2$	8×10^5	acid	1.0	298	chem.	C.k.; radical from homolysis of $CrCH(CH_3)OC_2H_5^{2+}$; rel. to $k(^{\cdot}CH(CH_3)OC_2H_5 + Co(NH_3)_5F^{2+}) = 1.1 \times 10^6$ L mol^{-1} s^{-1}.	86M354
19.14	**Aquabis[dimethylglyoximato]ethylcobalt(III), protonated**							
	$CH_3\dot{C}HOC_2H_5 + CH_3CH_2Co(dmg_2H_3)(H_2O)^+ \rightarrow CH_3CH_2CH(CH_3)OC_2H_5 + Co(dmg_2H_3)(H_2O)_2^+$	1×10^6	acid	1.0	298	chem.	C.k.; radical from homolysis of $CrCH(CH_3)OC_2H_5^{2+}$; $[H^+] = 0.15\text{-}1.0$ mol L^{-1}; rel. to $k(^{\cdot}CH(CH_3)OC_2H_5 + Co(NH_3)_5F^{2+}) = 1.1 \times 10^6$ L mol^{-1} s^{-1}.	86M354

TABLE 19. 1-Ethoxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
19.15	**Aquabis(dimethylglyoximato)(1-methylethyl)cobalt(III)**							
	$CH_3\dot{C}HOC_2H_5$ + $(CH_3)_2CHCo(dmgH)_2(H_2O)$ → $(CH_3)_2CHCH(CH_3)OC_2H_5$ + $Co(dmgH)_2(H_2O)_2$	7×10^5	acid	1.0	298	chem.	C.k.; radical from homolysis of $CrCH(CH_3)OC_2H_5^{2+}$; rel. to $k(^{\cdot}CH(CH_3)OC_2H_5 + Co(NH_3)_5F^{2+}) = 1.1 \times 10^6\ L\ mol^{-1}\ s^{-1}$.	86M354
19.16	**Aquabis[dimethylglyoximato)](1-methylethyl)cobalt(III), protonated**							
	$CH_3\dot{C}HOC_2H_5$ + $(CH_3)_2CHCo(dmg_2H_3)(H_2O)^+$ → $(CH_3)_2CHCH(CH_3)OC_2H_5$ + $Co(dmg_2H_3)(H_2O)_2^+$	6×10^5	acid	1.0	298	chem.	C.k.; radical from homolysis of $CrCH(CH_3)OC_2H_5^{2+}$; $[H^+] = 0.15$-1.0 mol L^{-1}; rel. to $k(^{\cdot}CH(CH_3)OC_2H_5 + Co(NH_3)_5F^{2+}) = 1.1 \times 10^6\ L\ mol^{-1}\ s^{-1}$.	86M354
19.17	**Aqua(benzyl)bis(dimethylglyoximato)cobalt(III)**							
	$CH_3\dot{C}HOC_2H_5$ + $C_6H_5CH_2Co(dmgH)_2(H_2O)$ → $C_6H_5CH_2CH(CH_3)OC_2H_5$ + $Co(dmgH)_2(H_2O)_2$	1.0×10^7	acid	1.0	298	chem.	C.k.; radical from homolysis of $CrCH(CH_3)OC_2H_5^{2+}$; rel. to $k(^{\cdot}CH(CH_3)OC_2H_5 + Co(NH_3)_5F^{2+}) = 1.1 \times 10^6\ L\ mol^{-1}\ s^{-1}$.	86M354
19.18	**Aquabenzylbis(dimethylglyoximato)cobalt(III), protonated**							
	$CH_3\dot{C}HOC_2H_5$ + $C_6H_5CH_2Co(dmg_2H_3)(H_2O)^+$ → $C_6H_5CH_2CH(CH_3)OC_2H_5$ + $Co(dmg_2H_3)(H_2O)_2^+$	1.4×10^7	acid	1.0	298	chem.	C.k.; radical from homolysis of $CrCH(CH_3)OC_2H_5^{2+}$; $[H^+] = 0.15$-1.0 mol L^{-1}; rel. to $k(^{\cdot}CH(CH_3)OC_2H_5 + Co(NH_3)_5F^{2+}) = 1.1 \times 10^6\ L\ mol^{-1}\ s^{-1}$.	86M354
19.19	**Chromium(II) ion**							
	$CH_3\dot{C}HOC_2H_5 + Cr^{2+}$ → $CrCH(CH_3)OC_2H_5^{2+}$	3.4×10^7	~3		293	p.r.	N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and ethyl ether; $\Delta V^{\ddagger} = 4.3\ cm^3\ mol^{-1}$, studied at 0.1-150 MPa.	92A361
		3.4×10^7	~1			p.r.	P.b.k. in Ar-satd. soln. contg. Et_2O-$HClO_4$.	741146
19.20	**Ferricyanide ion**							
	$CH_3\dot{C}HOC_2H_5 + Fe(CN)_6^{3-}$ → $Fe(CN)_6^{4-}$ + other prod.	4.0×10^9	4-6		295	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. diethyl ether.	82A041
19.21	**Hexachloroiridate(IV) ion**							
	$CH_3\dot{C}HOC_2H_5 + IrCl_6^{2-} \rightarrow IrCl_6^{3-}$ + other prod.	5.7×10^9	4-6		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. diethyl ether.	82A041
19.22	**Hydrogen peroxide**							
	$CH_3\dot{C}HOC_2H_5 + H_2O_2$ →	5.5×10^4				chem.	Calcd. from esr in Ti(III)-H_2O_2 soln. contg. Et_2O; assumed $2k(R + R) = 3 \times 10^9\ L\ mol^{-1}\ s^{-1}$.	745144
19.23	**Hexaammineruthenium(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Ru(NH_3)_6^{3+}$ →	1.0×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} ethyl ether.	771100
19.24	**Pentaammine(bromo)ruthenium(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Ru(NH_3)_5Br^{2+}$ →	5.8×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} ethyl ether.	771100
19.25	**Pentaammine(chloro)ruthenium(III) ion**							
	$CH_3\dot{C}HOC_2H_5 + Ru(NH_3)_5Cl^{2+}$ →	2.6×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} ethyl ether.	771100
19.26	**Hydrogen peroxomonosulfate ion**							
	$CH_3\dot{C}HOC_2H_5 + HSO_5^-$ →	2.0×10^6				chem.	Esr study in soln. contg. Ti(III) sulfate, H_2O_2, HSO_5^- and diethyl ether.	90D226

TABLE 19. 1-Ethoxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
19.27	**Peroxodisulfate ion**							
	$CH_3\dot{C}HOC_2H_5 + S_2O_8^{2-} \rightarrow SO_4^{\cdot-} + SO_4^{2-}$ + other prod.	7.5×10^5			~293	chem.	Esr study in soln. contg. 0.008 mol L^{-1} Ti(III), 0.01 mol L^{-1} H_2O_2, (0-0.025) mol L^{-1} $S_2O_8^{2-}$ and ~0.01 mol L^{-1} ethyl ether.	84D044
19.28	**Vanadium(II) ion**							
	$CH_3\dot{C}HOC_2H_5 + V^{2+} + H^+ \rightarrow (C_2H_5)_2O + V^{3+}$	5.9×10^4	~1		298	chem.	D.k. at 396 nm in soln. contg. $CrCH(CH_3)OC_2H_5$, diethyl ether, Cr^{2+}, $HClO_4$ and V^{2+}; k calcd. using $k(^{\cdot}CH(CH_3)OC_2H_5 + Cr^{2+}) = 3.4 \times 10^7$ L $mol^{-1}\ s^{-1}$ and k for homolysis of $CrCH(CH_3)OC_2H_5$.	83A237
19.29	**Carbon tetrachloride**							
	$CH_3\dot{C}HOC_2H_5 + CCl_4 \rightarrow$	2.5×10^7				p.r.	Condy changes; buildup of HCl in N_2O-satd. soln. contg. Et_2O.	710778
19.30	**Crotonic acid**							
	$CH_3\dot{C}HOC_2H_5 + CH_3CH{=}CHCO_2H \rightarrow$ addn.	2.0×10^6	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and Et_2O; calcd. using $2k(R + R)$.	93D265
19.31	**Nitrobenzene**							
	$CH_3\dot{C}HOC_2H_5 + C_6H_5NO_2 \rightarrow$	2.5×10^8				p.r.	D.k.; radical from ethyl ether.	771100
19.32	**Tetranitromethane**							
	$CH_3\dot{C}HOC_2H_5 + C(NO_2)_4 \rightarrow C(NO_2)_3^-$ + other prod.	$\sim 4 \times 10^9$				p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. ethyl ether.	80A071

TABLE 20. 1,2-Dihydroxyethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
20.1	**1,2-Dihydroxyethyl**							
	$^{\bullet}CHOHCH_2OH + {}^{\bullet}CHOHCH_2OH \rightarrow$	9.6×10^8				p.r.	D.k. at 245 nm in N_2O-satd. soln. contg. ethylene glycol; $\varepsilon = 880\ L\ mol^{-1}\ cm^{-1}$.	79B120
		3.4×10^8	6.0			p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. ethylene glycol; $2k/\varepsilon = 1.1 \times 10^6$ ($\varepsilon = 610\ L\ mol^{-1}\ cm^{-1}$).	730004
	$HOCH_2\dot{C}HO^- \rightarrow {}^{\bullet}CH_2CHO + OH^-$	$3.1 \times 10^6\ s^{-1}$	≥12			p.r.	C.k. in N_2O-satd. soln. contg. ethylene glycol; rel. to $k(HOCH_2\dot{C}HO^- + N$-methylisonicotinate ion) $= 3.8 \times 10^9\ L\ mol^{-1}\ s^{-1}$.	79A051
20.2	**Cadmium(II) ion**							
	$^{\bullet}CHOHCH_2OH + Cd^{2+} \rightarrow$	$<2.5 \times 10^5$				p.r.	*No reaction obs.*	751153
20.3	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$^{\bullet}CHOHCH_2OH +$ *N-rac*-$Co(4,11\text{-dieneN}_4)^{2+} \rightarrow$ $HOCH_2CHOHCo(4,11\text{-dieneN}_4)^{2+}$ + other prod.	$\sim 1 \times 10^7$	3-7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} ethylene glycol.	78A200
20.4	**Cobal(II)amin**							
	$^{\bullet}CHOHCH_2OH$ + B12r → addn.	1.8×10^8	5.9			p.r.	Abs. changes at 370, 390, 430 and 520 nm in soln. contg. 0.5 mol L^{-1} ethylene glycol; addn. prod. decomposes to Co(I) or H-Co(III) species.	82A176
		2.4×10^8				p.r.	P.b.k. at 525 nm as well as d.k. at 400 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} ethylene glycol.	751169
20.5	**Hexaamminebis(μ-hydroxy)[μ-(4-nitrobenzoato)]dicobalt(III) ion**							
	$^{\bullet}CHOHCH_2OH +$ $HO[Co(NH_3)_3]_2O_2CC_6H_4\text{-}4\text{-}NO_2^{3+} \rightarrow$ $HO[Co(NH_3)_3]_2O_2CC_6H_4\text{-}4\text{-}\dot{N}O_2^{2+}$	8×10^7			295	p.r.	P.b.k. at 370 nm in soln. of 50% H_2O-50% ethylene glycol; $\Delta H^{\ddagger} = 21\ kJ\ mol^{-1}$, studied at 203-295 K.	80A066
20.6	**Chromium(II) ion**							
	$^{\bullet}CHOHCH_2OH + Cr^{2+} \rightarrow$ $CrCHOHCH_2OH^{2+}$	1.0×10^8	~3		293	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and ethylene glycol; $\Delta V^{\ddagger} = 4.8\ cm^3\ mol^{-1}$, studied at 0.1-150 MPa.	92A361
		1.5×10^8	3.0-4.5			p.r.	P.b.k. in Ar-satd. soln. contg. ethylene glycol-$HClO_4$.	741146
20.7	**Pentacyano(nitrosyl)ferrate(III) ion**							
	$^{\bullet}CHOHCH_2OH + Fe(CN)_5(NO)^{2-} \rightarrow$ $Fe(CN)_5NO^{3-} + H^+ + HOCH_2CHO$	2.4×10^8	7			p.r.	P.b.k. at 435 nm in N_2O- or Ar-satd. soln. contg. 0.2 mol L^{-1} ethylene glycol and 5×10^{-4} mol L^{-1} substrate.	86A306
20.8	**Ferricyanide ion**							
	$^{\bullet}CHOHCH_2OH + Fe(CN)_6^{3-} \rightarrow$	3.6×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} ethylene glycol.	690522
20.9	**Hydrogen ion**							
	$^{\bullet}CHOHCH_2OH + H^+ \rightarrow {}^{\bullet}CH_2CHO +$ $H_2O + H^+$	1.1×10^7				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1,2-ethanediol at varied $[H^+]$; acid catalyzed dehydration.	86A220
20.10	**Hydroxide ion**							
	$^{\bullet}CHOHCH_2OH + OH^- \rightarrow$ $HOCH_2\dot{C}HO^- + H_2O$	$\sim 10^{10}$	10			p.r.	Absorption spectrum immediately after pulse in N_2O-satd. soln. contg. ethylene glycol decays in <10 μs to formylmethyl spectrum.	730004

TABLE 20. 1,2-Dihydroxyethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
20.11	**Oxygen**							
	$^{\bullet}CHOHCH_2OH + O_2 \rightarrow$ $^{\bullet}OOCHOHCH_2OH$	3.2×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.3 mol L^{-1} ethylene glycol with ferricyanide. rel. to $k(^{\bullet}CHOHCH_2OH + Fe(CN)_6^{3-}) = 3.6 \times 10^9$ L $mol^{-1}\ s^{-1}$.	690522
20.12	**1,1'-Dimethyl-4,4'-bipyridinium**							
	$^{\bullet}CHOHCH_2OH + MV^{2+} \rightarrow MV^{\bullet+}$ + other prod.	1.8×10^8	6			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1,2-ethanediol.	86A220
20.13	**Dithiothreitol**							
	$^{\bullet}CHOHCH_2OH +$ $HSCH_2(CHOH)_2CH_2SH \rightarrow$ $HSCH_2(CHOH)_2CH_2S^{\bullet} +$ $HOCH_2CH_2OH$	2.6×10^7	7.4			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. dithiothreitol and 0.1 mol L^{-1} ethylene glycol.	87A250
20.14	**2-Methyl-2-nitrosopropane**							
	$^{\bullet}CHOHCH_2OH + (CH_3)_3CNO \rightarrow$ addn.	3.4×10^7	~7		~291	p.r.	P.b.k. in unbuffered N_2O-satd. soln. contg. 0.25 mol L^{-1} ethylene glycol and (0.25-15) $\times$ 10^{-3} mol L^{-1} MNP (assuming complete dimer dissociation).	91D097
20.15	**Tetranitromethane**							
	$CHOHCH_2OH + C(NO_2)_4 \rightarrow$	1.7×10^9				p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} ethylene glycol.	730126

TABLE 21. Formylmethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
21.1	**Formylmethyl**							
	$^{\bullet}CH_2CHO + {}^{\bullet}CH_2CHO \rightarrow$	7.5×10^7	7.4			p.r.	D.k. at 260 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} ethylene glycol or 0.1 mol L^{-1} acetaldehyde.	91A488
		4.5×10^8	9.8			p.r.	D.k. in N_2O-satd. soln. contg. 10^{-3} mol L^{-1} acetylene; $2k/\varepsilon = 3.4 \times 10^6$ cm s^{-1}.	78A007
		4.5×10^8	10			p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} ethylene glycol; $\varepsilon = 260$ L mol^{-1} cm^{-1} at 300 nm.	730004
21.2	**Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion**							
	$^{\bullet}CH_2CHO + Co(4,11\text{-dieneN}_4)(H_2O)_2^{2+} \rightarrow CHOCH_2Co(4,11\text{-dieneN}_4)(H_2O)^{2+}$	8×10^7	1-3, 7-10			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} *ethylene glycol.*	78A200
21.3	**Dihydroxytetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion**							
	$^{\bullet}CH_2CHO + CoTPPS(OH)_2^{6-} \rightarrow$	2.0×10^9	12			p.r.	D.k. as well as p.b.k. in N_2O-satd. soln. contg. ethylene glycol; addn. or oxidation.	81A317
21.4	**Chromium(II) ion**							
	$^{\bullet}CH_2CHO + Cr^{2+} + H_2O \rightarrow CrCH_2CH(OH)_2^{2+}$	3.5×10^8	~1			p.r.	P.b.k. in Ar-satd. soln. contg. ethylene glycol-$HClO_4$.	741146
21.5	**Tris(1,10-phenanthroline)iron(III) ion**							
	$^{\bullet}CH_2CHO + Fe(phen)_3^{3+} \rightarrow$	$<1 \times 10^6$	~1			p.r.	No reaction obs. in soln. contg. ethylene glycol.	85A284
21.6	**Ferrocyanide ion**							
	$^{\bullet}CH_2CHO + Fe(CN)_6^{4-} + H^+ \rightarrow CH_3CHO + Fe(CN)_6^{3-}$	8.7×10^6	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.9 mol L^{-1} ethylene glycol	90C007
21.7	**Hexachloroiridate(IV) ion**							
	$^{\bullet}CH_2CHO + IrCl_6^{2-} \rightarrow$	1.7×10^9	7			p.r.	D.k. at 490 nm in soln. contg. 2-*chloroethanol.*	82A041
21.8	**Bis(hydroxy)tetrakis(4-pyridyl)porphinatomanganate(III) ion**							
	$^{\bullet}CH_2CHO + (OH)_2MnTpyP^- \rightarrow$	$\sim 4 \times 10^8$	11.9			p.r.	D.k. as well as p.b.k. in N_2O-satd. soln. contg. ethylene glycol.	84A120
21.9	**Bis(hydroxy)tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion**							
	$^{\bullet}CH_2CHO + (OH)_2MnTPPS^{5-} \rightarrow$	6.2×10^8	12.4			p.r.	D.k. as well as p.b.k. in N_2O-satd. soln. contg. ethylene glycol.	84A120
21.10	**Bis(hydroxy)tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion**							
	$^{\bullet}CH_2CHO + (OH)_2MnTMpyP^{3+} \rightarrow$	2.2×10^8	12.4			p.r.	D.k. as well as p.b.k. in N_2O-satd. soln. contg. ethylene glycol.	84A120
21.11	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatozincate(II) ion**							
	$^{\bullet}CH_2CHO + ZnTPPS^{4-} + H^+ \rightarrow CH_3CHO + [ZnTPPS]^{\bullet 3-}$	$\sim 1.5 \times 10^8$	12			p.r.	D.k. as well as p.b.k. in N_2O-satd. soln. contg. ethylene glycol.	81A317
21.12	**4-Aminophenoxide ion**							
	$^{\bullet}CH_2CHO + 4\text{-}NH_2C_6H_4O^- + H^+ \rightarrow CH_3CHO + 4\text{-}H_2NC_6H_4O^{\bullet}$	2.1×10^9	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. N_2O and ethylene glycol.	79A051
21.13	**Ascorbate ion**							
	$^{\bullet}CH_2CHO + AH^- \rightarrow CH_3CHO + A^{\bullet -}$	7×10^8				p.r.	P.b.k. in N_2O-satd. soln.	88A266
		8.8×10^7	7		296	p.r.	P.b.k. in N_2O-satd. soln. contg. $ClCH_2CH_2OH$.	79A051

TABLE 21. Formylmethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
21.14	**2-*tert*-Butylhydroquinone dianion**							
	$^{\bullet}CH_2CHO + (CH_3)_3CQ^{2-} + H_2O \rightarrow CH_3CHO + (CH_3)_3CQ^{\bullet-} + OH^-$	1.7×10^9	13.5		295	p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 0.9 mol L^{-1} ethylene glycol, ~0.5 mol L^{-1} KOH and *tert*-butylhydroquinone.	95A022
21.15	**Catechin, conjugate base**							
	$^{\bullet}CH_2CHO + H^+ + ArO^- \rightarrow CH_3CHO + ArO^{\bullet}$	1.8×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.16	**Catechol monoanion**							
	$^{\bullet}CH_2CHO + 2\text{-}HOC_6H_4O^- \rightarrow CH_3CHO + 2\text{-}^-OC_6H_4O^{\bullet}$	7.4×10^8	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	79A051
21.17	**1,4-Dihydroxy-9,10-anthraquinone-2-sulfonate ion**							
	$^{\bullet}CH_2CHO + Q2SH_2 \rightarrow Q2SH^{\bullet} + CH_3CHO$	1.2×10^{10}	1			p.r.	P.b.k. at >650 nm in N_2-satd. soln. contg. ethylene glycol.	92A203
21.18	**1,4-Dihydroxy-9,10-anthraquinone-6-sulfonate ion**							
	$^{\bullet}CH_2CHO + Q6SH_2 \rightarrow Q6SH^{\bullet} + CH_3CHO$	2.0×10^{10}	1			p.r.	P.b.k. at >650 nm in N_2-satd. soln. contg. ethylene glycol.	92A203
21.19	**3,4-Dihydroxycinnamate trianion**							
	$^{\bullet}CH_2CHO + H^+ + 3,4\text{-}(^-O)_2C_6H_3CH{=}CHCO_2^- \rightarrow CH_3CHO + 3,4\text{-}(^{\bullet}O)(^-O)C_6H_3CH{=}CHCO_2^-$	2.6×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.20	**6,7-Dihydroxycoumarin, conjugate base**							
	$^{\bullet}CH_2CHO + H^+ + ArO^- \rightarrow CH_3CHO + ArO^{\bullet}$	2×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.21	**5,8-Dihydroxy-1,4-naphthoquinone, conjugate dibase**							
	$^{\bullet}CH_2CHO + 5,8\text{-}NQ(O^-)_2 \rightarrow CH_3CHO + {}^{\bullet}NQ(OH)_2^-$	3.6×10^9	~13			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} ethylene glycol and $(2\text{-}12) \times 10^{-5}$ mol L^{-1} naphthazarin.	88A374
21.22	**5,8-Dihydroxy-1,4-naphthoquinone**							
	$^{\bullet}CH_2CHO + 5,8\text{-}NQ(OH)_2 \rightarrow CH_3CHO + {}^{\bullet}NQH(OH)_2$	9.0×10^9	~1			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} ethylene glycol and $(2\text{-}12) \times 10^{-5}$ mol L^{-1} naphthazarin.	88A374
21.23	**2,5-Dihydroxyphenylacetate ion, conjugate dibase**							
	$^{\bullet}CH_2CHO + H^+ + 2,5\text{-}(^-O)_2C_6H_3CH_2CO_2^- \rightarrow CH_3CHO + 2,5\text{-}(^{\bullet}O)(^-O)C_6H_3CH_2CO_2^-$	1.7×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.24	**DL-3,4-Dihydroxyphenylalanine**							
	$^{\bullet}CH_2CHO + (HO)_2C_6H_3CH_2CH(NH_2)CO_2H \rightarrow$	1.4×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.25	**4-(Dimethylamino)phenoxide ion**							
	$^{\bullet}CH_2CHO + H^+ + (CH_3)_2NC_6H_4O^- \rightarrow CH_3CHO + 4\text{-}(CH_3)_2NC_6H_4O^{\bullet}$	2.2×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.26	**Dithiothreitol, anion**							
	$^{\bullet}CH_2CHO + HSCH_2(CHOH)_2CH_2S^- \rightarrow HSCH_2(CHOH)_2CH_2S^{\bullet} + CH_3CHO$	1.2×10^8 3.5×10^8	10 11.1			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. dithiothreitol and 0.1 mol L^{-1} ethylene glycol.	87A250
21.27	**Ellagic acid, conjugate base**							
	$^{\bullet}CH_2CHO + H^+ + ArO^- \rightarrow CH_3CHO + ArO^{\bullet}$	2.4×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253

TABLE 21. Formylmethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
21.28	**4-Ethylphenoxide ion**							
	$^{\bullet}CH_2CHO + 4\text{-}EtC_6H_4O^- + H^+ \rightarrow CH_3CHO + 4\text{-}EtC_6H_4O^{\bullet}$	7.0×10^7	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	79A051
21.29	**Hydroquinone**							
	$^{\bullet}CH_2CHO + QH_2 \rightarrow$	$\leq 2 \times 10^6$	7.2		296	p.r.	P.b.k. in N_2O-satd. soln. contg. 2-chloroethanol.	79A051
21.30	**Hydroquinone monoanion**							
	$^{\bullet}CH_2CHO + 4\text{-}HOC_6H_4O^- \rightarrow CH_3CHO + Q^{\bullet -}$	2.2×10^9	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol or 2-methoxy- or 2-ethoxyethanol.	79A051
21.31	***p*-Hydroxycinnamate ion, conjugate base**							
	$^{\bullet}CH_2CHO + H^+ + 4\text{-}(O^-)C_6H_4CH{=}CHCO_2^- \rightarrow 4\text{-}^{\bullet}OC_6H_4CH{=}CHCO_2^-$	7.7×10^7	11.5			p.r.	P.b.k. at 595 nm in soln. contg. 1 mol L^{-1} ethylene glycol.	84A206
21.32	**7-Hydroxycoumarin, conjugate base**							
	$^{\bullet}CH_2CHO + H^+ + ArO^- \rightarrow CH_3CHO + ArO^{\bullet}$	1.3×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.33	**5-Hydroxydopamine**							
	$^{\bullet}CH_2CHO + (HO)_3C_6H_2CH_2CH_2NH_2 \rightarrow$	1.8×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.34	**6-Hydroxydopamine**							
	$^{\bullet}CH_2CHO + (HO)_3C_6H_2CH_2CH_2NH_2 \rightarrow$	1.8×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.35	**5-Hydroxyindole, conjugate base**							
	$^{\bullet}CH_2CHO + H^+ + [5\text{-}InH\text{-}O^-] \rightarrow CH_3CHO + 5\text{-}InH\text{-}O^{\bullet}$	1.3×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.36	**3-Hydroxyphenoxide ion**							
	$^{\bullet}CH_2CHO + 3\text{-}HOC_6H_4O^- \rightarrow CH_3CHO + 3\text{-}^-OC_6H_4O^{\bullet}$	1.3×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
		1.6×10^9	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	79A051
21.37	**6-Hydroxy-2,5,7,8-tetramethylchroman-2-carboxylate dianion**							
	$^{\bullet}CH_2CHO + H^+ + TxO^{2-} \rightarrow CH_3CHO + TxO^-$	1.8×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.38	**5-Hydroxytryptophan**							
	$^{\bullet}CH_2CHO + 5\text{-}OHTrpH \rightarrow$	1.3×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.39	**Isobarbiturate ion**							
	$^{\bullet}CH_2CHO + H^+ + IBO^- \rightarrow CH_3CHO + IBO^{\bullet}$	1.6×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.40	**4-Methoxyphenoxide ion**							
	$^{\bullet}CH_2CHO + 4\text{-}CH_3OC_6H_4O^- + H^+ \rightarrow CH_3CHO + 4\text{-}CH_3OC_6H_4O^{\bullet}$	9.8×10^8	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	79A051
		8.3×10^8	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.41	**4-Methylphenoxide ion**							
	$^{\bullet}CH_2CHO + 4\text{-}CH_3C_6H_4O^- + H^+ \rightarrow CH_3CHO + 4\text{-}CH_3C_6H_4O^{\bullet}$	9.0×10^7	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	79A051

TABLE 21. Formylmethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH-	I	T(K)	Method	Comment	Ref.
21.42	**Metiazinic acid, conjugate base**							
	$^{\bullet}CH_2CHO + MZ^- + H^+ \rightarrow CH_3CHO + [MZ]^{\bullet}$	2×10^8	10			p.r.	P.b.k. at 529 nm in N_2O-satd. soln. contg. 1 mol L^{-1} ethylene glycol; 51% e-transfer.	81A162
21.43	**Noradrenaline**							
	$^{\bullet}CH_2CHO + (HO)_2C_6H_3CH(CH_2NH_2)OH \rightarrow$	1.5×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.44	**Phenoxide ion**							
	$^{\bullet}CH_2CHO + C_6H_5O^- + H^+ \rightarrow CH_3CHO + C_6H_5O^{\bullet}$	4.3×10^6	~11.5		296	p.r.	P.b.k. in N_2O-satda. soln. contg. ethylene glycol.	79A051
21.45	***o*-Phenylenediamine**							
	$^{\bullet}CH_2CHO + 1,2\text{-}C_6H_4(NH_2)_2 \rightarrow CH_3CHO + 2\text{-}H_2NC_6H_4\dot{N}H$	7.7×10^7	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
		7.3×10^7	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	79A051
21.46	***p*-Phenylenediamine**							
	$^{\bullet}CH_2CHO + 1,4\text{-}C_6H_4(NH_2)_2 \rightarrow CH_3CHO + 4\text{-}H_2NC_6H_4\dot{N}H$	4.6×10^8	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
		4.0×10^8	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	79A051
21.47	**Quercetin, conjugate base**							
	$^{\bullet}CH_2CHO + QO^- + H^+ \rightarrow CH_3CHO + QO^{\bullet}$	3.1×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.48	**Rutin, conjugate base**							
	$CH_2CHO + ArO^- \rightarrow C_{27}H_{29}O_{16} + CH_3CHO + H^+$	1.5×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.49	**1,2,5,8-Tetrahydroxy-9,10-anthraquinone, conjugate base**							
	$^{\bullet}CH_2CHO + ArO^- \rightarrow ArO^{\bullet} + CH_3CHO + H^+$	2.4×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
21.50	***N,N,N′,N′*-Tetramethyl-*p*-phenylenediamine**							
	$^{\bullet}CH_2CHO + TMPD + H^+ \rightarrow CH_3CHO + TMPD^{\bullet+}$	2.1×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253
		2.0×10^9	~11.5		296	p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	79A051
21.51	**3,4,5-Trihydroxybenzoate ion, conjugate dibase**							
	$^{\bullet}CH_2CHO + 3,4,5\text{-}(OH)(^-O)_2C_6H_2CO_2^- \rightarrow CH_3CHO + 3,4,5\text{-}(^{\bullet}O)(^-O)_2C_6H_2CO_2^-$	1.4×10^9	13.5			p.r.	P.b.k. in N_2O-satd. soln. contg. ethylene glycol.	82A253

TABLE 22. Carboxymethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
22.1	**Carboxymethyl**							
	$^{\bullet}CH_2CO_2H + {}^{\bullet}CH_2CO_2H \rightarrow$	9×10^8	3			p.r.	D.k. in N_2O-satd. soln. contg. acetic acid; ε = 650 $L\ mol^{-1}\ cm^{-1}$ at 320 nm; $pK_a = 4.5$.	690446
22.2	**Carboxymethyl, anion**							
	$^{\bullet}CH_2CO_2^- + {}^{\bullet}CH_2CO_2^- \rightarrow$	5.5×10^8	6.5			p.r.	D.k. at 366 nm in N_2O-satd. soln. contg. Na acetate; ε = 780 $L\ mol^{-1}\ cm^{-1}$.	761082
		5×10^8	10			p.r.	D.k. in N_2O-satd. soln. contg. acetate ion; ε = 800 $L\ mol^{-1}\ cm^{-1}$ at 350 nm.	690446
22.3	**Diaqua(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(II) ion**							
	$^{\bullet}CH_2CO_2^- +$ $Co(4,11\text{-dieneN}_4)(H_2O)_2^{2+} \rightarrow$	$<1 \times 10^7$				p.r.	No reaction obs.	78A200
22.4	**Diaqua(nitrilotriacetato)cobaltate(II) ion**							
	$^{\bullet}CH_2CO_2^- + CoNTA^- \rightarrow$ $O_2CCH_2CoNTA^{2-}$	1.5×10^7	4-7		298	p.r.	P.b.k. at 260 nm in N_2O-satd. soln. contg. $1\text{-}50 \times 10^{-4}$ mol L^{-1} CoNTA and 0.2-1 mol L^{-1} AcOH.	88A343
22.5	**Hexaamminecobalt(III) ion**							
	$^{\bullet}CH_2CO_2^- + Co(NH_3)_6^{3+} \rightarrow$	$<3.2 \times 10^6$	7.3			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} acetate.	72A018
	$^{\bullet}CH_2CO_2H + Co(NH_3)_6^{3+} \rightarrow$	$<1.0 \times 10^7$	2.5			p.r.	D.k. in Ar-satd. soln. contg. 0.01 mol L^{-1} acetic acid.	72A018
22.6	**Chromium(II) ion**							
	$^{\bullet}CH_2CO_2H + Cr^{2+} \rightarrow CrCH_2CO_2H^{2+}$	2.5×10^8	~1			p.r.	P.b.k. in Ar-satd. soln. contg. acetic acid and $HClO_4$.	741146
22.7	**Dichromate(VI) ion**							
	$^{\bullet}CH_2CO_2H + Cr_2O_7^{2-} \rightarrow$ Cr(V) + other prod.	1.8×10^8	0.5, ~3.0			p.r.	D.k. at 350 nm, as well as 310 nm, in N_2O-satd. soln. contg. $(1\text{-}6) \times 10^{-4}$ mol L^{-1} dichromate and 0.1 mol L^{-1} acetic acid.	91A230
22.8	**Copper(II) ion**							
	$^{\bullet}CH_2CO_2^- + Cu^{2+} \rightarrow CuCH_2CO_2^+$	6.4×10^8	6.0			p.r.	D.k. in N_2O-satd. 10^{-2} mol L^{-1} acetate soln. Final product is Cu^+.	771025
22.9	**Copper(II) triglycine**							
	$^{\bullet}CH_2CO_2^- + Cu(Gly_3)^- \rightarrow$ $(Gly_3)CuCH_2CO_2^{2-}$	1.6×10^7	~7			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} acetate ion.	79A445
22.10	**Copper(II) tetraglycine**							
	$^{\bullet}CH_2CO_2^- + Cu(Gly_4)^{2-} \rightarrow$ $(Gly_4)CuCH_2CO_2^{3-}$	9×10^6	8.1			p.r.	P.b.k. at 320 nm in N_2O-satd. soln. contg. 1 mol L^{-1} acetate ion.	80A304
22.11	**Tris(1,10-phenanthroline)iron(III) ion**							
	$^{\bullet}CH_2CO_2H + Fe(phen)_3^{3+} \rightarrow$ redn.	1.2×10^6	~1			p.r.	Estd. from k_{obs} in soln. contg. 1.5-4.0 mol L^{-1} AcOH (reacts with >90% of $^{\bullet}OH$ and <15% of $H^{\bullet}$) and $(2\text{-}6) \times 10^{-4}$ mol L^{-1} complex, and G value; probably inner-sphere mechanism.	85A284
22.12	**Ferricyanide ion**							
	$^{\bullet}CH_2CO_2H + Fe(CN)_6^{3-} \rightarrow$ electron transfer	2×10^6	3.3		293	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. acetic acid.	82A041
22.13	**Hexachloroiridate(IV) ion**							
	$^{\bullet}CH_2CO_2H + IrCl_6^{2-} \rightarrow IrCl_5^{2-} +$ $ClCH_2CO_2H$	1.4×10^9	3.3		293	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. acetate.	82A041

TABLE 22. Carboxymethyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
22.13	**Hexachloroiridate(IV) ion** — Continued							
	$^{\bullet}CH_2CO_2^- + IrCl_6^{2-} \rightarrow IrCl_5^{2-} + ClCH_2CO_2^-$	4.2×10^8	7			p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. acetate.	82A041
22.14	**Oxygen**							
	$^{\bullet}CH_2CO_2^- + O_2 \rightarrow {}^{\bullet}OOCH_2CO_2^-$	1.7×10^9	8			p.r.	P.b.k. at 275 nm in N_2O/O_2 (4:1 v/v) satd. soln. contg. 0.01 mol L^{-1} acetate ion.	85A106
		2.1×10^9	8.2			p.r.	D.k. at 366 nm in N_2O/O_2 satd. soln. contg. 0.01 mol L^{-1} acetate; cor. for $k(R + R) = 5.5 \times 10^8$ L mol^{-1} s^{-1}.	761082
		3×10^9	8			p.r.	D.k. at 370 nm in N_2O/O_2 satd. soln. contg. 0.1 mol L^{-1} acetate.	761207
22.15	**Ozone**							
	$^{\bullet}CH_2CO_2^- + O_3 \rightarrow \dot{O}_3CH_2CO_2^-$	1.5×10^9	9-10			p.r.	D.k. at 350 nm ($^{\bullet}CH_2CO_2^-$), as well as p.b.k. at 430 nm (O_3^-), in N_2O-satd. soln. contg. $(1\text{-}2) \times 10^{-4}$ mol L^{-1} ozone and $(1\text{-}10) \times 10^{-2}$ mol L^{-1} acetate ion; computer simulation; product decomposes to $^{\bullet}O_2^-$, CO_2 and CH_2O.	87A13
22.16	**Hexaammineruthenium(III) ion**							
	$^{\bullet}CH_2CO_2H + Ru(NH_3)_6^{3+} \rightarrow$	$\leq 5 \times 10^6$	3.9			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} acetic acid.	771100
		$<3.0 \times 10^7$	2.5			p.r.	D.k. in Ar-satd. soln. contg. 0.01 mol L^{-1} acetic acid.	72A018
	$^{\bullet}CH_2CO_2^- + Ru(NH_3)_6^{3+} \rightarrow$	$<1 \times 10^7$	7.3			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} acetate.	72A018
22.17	**Pentaammine(bromo)ruthenium(III) ion**							
	$^{\bullet}CH_2CO_2H + Ru(NH_3)_5Br^{2+} \rightarrow$	4.6×10^8	3.9			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} acetic acid.	771100
22.18	**Pentaammine(chloro)ruthenium(III) ion**							
	$^{\bullet}CH_2CO_2H + Ru(NH_3)_5Cl^{2+} \rightarrow$	4.0×10^7	3.9			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} acetic acid.	771100
22.19	**Titanium(III) ions**							
	$^{\bullet}CH_2CO_2H + Ti^{3+} \rightarrow TiCH_2CO_2H^{3+}$	4×10^6	0.5			p.r.	P.b.k. in soln. contg. 2 mol L^{-1} AcOH and 0.3 mol L^{-1} sulfuric acid. Complex formn. deduced from transient spectra. Product is Ti(IV).	79A341
22.20	**Uranium(III) ion**							
	$^{\bullet}CH_2CO_2H + U^{3+} \rightarrow UCH_2CO_2H^3$	1.2×10^8	0.3			p.r.	D.k. at 355 nm in He-satd. soln. contg. 0.5 mol L^{-1} $HClO_4$ and 0.1-1 mol L^{-1} AcOH.	85A122
22.21	**2-Methyl-2-nitrosopropane**							
	$^{\bullet}CH_2CO_2^- + (CH_3)_3CNO \rightarrow (CH_3)_3CN(\dot{O})CH_2CO_2^-$	7.0×10^6	9.2		~291	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} Na acetate, 0.01 mol L^{-1} borate buffer and $(0.25\text{-}15) \times 10^{-3}$ mol L^{-1} MNP (assuming complete MNP dimer dissociation).	91D097
22.22	***aci*-Nitromethane anion**							
	$^{\bullet}CH_2CO_2^- + CH_2NO_2^- \rightarrow {}^-O_2CCH_2CH_2NO_2^{\bullet -}$	7.9×10^7	11.3		~285	p.r.	P.b.k. in N_2O-satd. soln. contg. $0.5\text{-}5 \times 10^{-3}$ mol L^{-1} nitromethane and 0.5 mol L^{-1} acetate ion; d.k. gave $k = 8.8 \times 10^7$ L mol^{-1} s^{-1}.	88D069

TABLE 23. Carboxy(hydroxy)methyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
23.1	**(Carboxy)hydroxymethyl**							
	$^{\bullet}CHOHCO_2H + {}^{\bullet}CHOHCO_2H \rightarrow$	6.5×10^8	1			p.r.	D.k in N_2O-satd. soln. contg. 0.05 mol L^{-1} glycolic acid ($\varepsilon = 6000\ L\ mol^{-1}\ cm^{-1}$); pK_a = 4.6.	690447
	$^{\bullet}CHOHCO_2^- + {}^{\bullet}CHOHCO_2^- \rightarrow$	4.3×10^8	7.2			p.r.	D.k in N_2O-satd. soln. contg. 0.05 mol L^{-1} glycolic acid ($\varepsilon = 6000\ L\ mol^{-1}\ cm^{-1}$); pK_a = 8.8.	690447
	$^{\bullet}CHO^-CO_2^- + {}^{\bullet}CHO^-CO_2^- \rightarrow$	7.5×10^6	12			p.r.	D.k in N_2O-satd. soln. contg. 0.05 mol L^{-1} glycolic acid ($\varepsilon = 6000\ L\ mol^{-1}\ cm^{-1}$).	690447
23.2	**Tetrahydroxyborate ion**							
	$^{\bullet}CHOHCO_2^- + B(OH)_4^- \rightarrow$ $^{\bullet}CHO^-CO_2^- + H_3BO_3 + H_2O$	1.4×10^7	9.16, 9.75	→0		p.r.	Calcd. from effect of borate on d.k. at 270 nm in N_2O-satd. soln. contg. glycolate.	751053
23.3	**Chromium(II) ion**							
	$^{\bullet}CHOHCO_2H + Cr^{2+} \rightarrow$ $CrCHOHCO_2H^{2+}$	1.4×10^8	1			p.r.	P.b.k. in Ar-satd. soln. contg. glycolic acid and $HClO_4$.	741146
23.4	**Ferricyanide ion**							
	$^{\bullet}CHOHCO_2H + Fe(CN)_6^{3-} \rightarrow$ $Fe(CN)_6^{4-}$ + other prod.	1.0×10^8	3.4		295	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. glycolic acid.	82A041
	$^{\bullet}CHOHCO_2^- + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-}$ + other prod.	5×10^8	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} glycolate ion.	690522
	$^-O\dot{C}HCO_2^- + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-}$ + other prod.	7.5×10^8	11.5		295	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. glycolate.	82A041
23.5	**Hexachloroiridate(IV) ion**							
	$^{\bullet}CHOHCO_2H + IrCl_6^{2-} \rightarrow IrCl_6^{3-}$ + other prod.	2.3×10^9	3.3		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. glycolate.	82A041
	$^{\bullet}CHOHCO_2^- + IrCl_6^{2-} \rightarrow IrCl_6^{3-}$ + other prod.	2.0×10^9	6.9		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. glycolate.	82A041
	$^-O\dot{C}HCO_2^- + IrCl_6^{2-} \rightarrow IrCl_6^{3-}$ + other prod.	1.8×10^9	10.7		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. glycolate.	82A041
23.6	**Ammonia**							
	$^{\bullet}CHOHCO_2^- + NH_3 \rightarrow {}^{\bullet}CHO^-CO_2^- + NH_4^+$	7.5×10^8	9.26, 9.75	→0		p.r.	Calcd. from effect of [NH_3] in buffer soln. on d.k. at 270 nm in N_2O-satd. soln. contg. glycolate.	751053
23.7	**Hydroxide ion**							
	$^{\bullet}CHOHCO_2^- + OH^- \rightarrow {}^{\bullet}CHO^-CO_2^- + H_2O$	3.9×10^9	9.5-10.5	→0		p.r.	Calcd. from effect of [OH^-] in buffer soln. on d.k. at 270 nm in N_2O-satd. soln. contg. glycolate; $k = 3.1 \times 10^9\ L\ mol^{-1}\ s^{-1}$ in unbuffered soln.	751053
23.8	**Oxygen**							
	$^{\bullet}CHOHCO_2^- + O_2 \rightarrow {}^{\bullet}OOCHOHCO_2^-$	1.8×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.3 mol L^{-1} glycolate and ferricyanide. rel. to $k(^{\bullet}CHOHCO_2^- + Fe(CN)_6^{3-}) = 5 \times 10^8\ L\ mol^{-1}\ s^{-1}$.	690522
23.9	**Pyrophosphate ion**							
	$^{\bullet}CHOHCO_2^- + P_2O_7^{4-} \rightarrow {}^{\bullet}CHO^-CO_2^- + HP_2O_7^{3-}$	5.8×10^6	9.26, 9.75	→0		p.r.	Calcd. from effect of [$P_2O_7^{4-}$] on d.k. at 270 nm in N_2O-satd. glycolate soln.	751053
23.10	**9,10-Anthraquinone-2-sulfonate ion**							
	$^{\bullet}CHOHCO_2^- + 2\text{-}SO_3AQ^- \rightarrow$ $[2\text{-}SO_3AQ]^{\bullet 2-}$ + other prod.	7.1×10^8	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycolate.	731104

TABLE 23. Carboxy(hydroxy)methyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
23.11	**1,4-Benzoquinone**							
	$^{\bullet}CHOHCO_2^- + Q \rightarrow Q^{\bullet -} +$ other prod.	2.2×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycolate; 72% *e*-transfer.	731052 731104
23.12	**2-Hydroxy-1,4-naphthoquinone**							
	$^{\bullet}CHOHCO_2^- +$ 2-(OH)NQ $\rightarrow$ 2-(OH)$NQ^{\bullet -}$ + other prod.	9.1×10^8	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycolate.	731104
23.13	**2-Methyl-1,4-naphthoquinone**							
	$^{\bullet}CHOHCO_2H +$ 2-CH_3NQ $\rightarrow$	9.2×10^8	3.2			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycolic acid; 13% *e*-transfer.	731047
	$CHOHCO_2^- +$ 2-CH_3NQ $\rightarrow$	1.5×10^9	6.5			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycolate ion; 69% *e*-transfer.	731047 731104
	$^{\bullet}CHO^-CO_2^- +$ 2-CH_3NQ $\rightarrow$	1.6×10^9	10.6			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycolate ion; 77% *e*-transfer.	731047
23.14	**1,4-Naphthoquinone-2-sulfonate ion**							
	$CHOHCO_2^- +$ 2-$SO_3NQ^- \rightarrow$ $[2\text{-}SO_3NQ]^{\bullet 2-}$ + other prod	1.7×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycolate ion.	731104
23.15	**Riboflavine**							
	$^{\bullet}CHOHCO_2^- +$ RF $\rightarrow$ electron transfer	9.3×10^8	7.0			p.r.	P.b.k. at 560 nm in N_2O-satd. soln. contg. glycolate ion.	731104

TABLE 24. Carboxy(hydroxy)ethyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
24.1	**Hexaamminecobalt(III) ion**							
	$CH_3\dot{C}OHCO_2^- + Co(NH_3)_6^{3+} \rightarrow$ electron transfer	7.0×10^6	6.0			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} lactate.	72A018
	$CH_3\dot{C}(O^-)CO_2^- + Co(NH_3)_6^{3+} \rightarrow$ electron transfer	2.4×10^{10}	12.0			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} lactate.	72A018
24.2	**Chromium(II) ion**							
	$CH_3\dot{C}OHCO_2H + Cr^{2+} \rightarrow CrCOH(CH_3)CO_2H^{2+}$	9.2×10^7	~1			p.r.	P.b.k. in Ar-satd. soln. contg. lactic acid and $HClO_4$.	741146
24.3	**Hemin c**							
	$CH_3\dot{C}OHCO_2^- + Hem\text{-}Fe^{III} \rightarrow Hem\text{-}Fe^{II}$ + other prod.	5.6×10^8	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.025 mol L^{-1} lactate.	75A241
24.4	**Ferricyanide ion**							
	$CH_3\dot{C}OHCO_2^- + Fe(CN)_6^{3-} \rightarrow$	1.5×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} lactate ion.	690522
24.5	**Oxygen**							
	$CH_3\dot{C}OHCO_2^- + O_2 \rightarrow CH_3C(OO^{\bullet})(OH)CO_2^-$	3.5×10^8	7.3			p.r.	D.k. at 270 nm in N_2O/O_2-satd. soln. contg. lactate ion.	731052
		2.6×10^9	7			p.r.	C.k. in soln. contg. 0.3 mol L^{-1} lactate; rel. to $k(CH_3\dot{C}OHCO_2^- + Fe(CN)_6^{3-}) \approx 1.5 \times 10^9$ L $mol^{-1}\ s^{-1}$.	690522
24.6	**Hexaammineruthenium(III) ion**							
	$CH_3\dot{C}OHCO_2^- + Ru(NH_3)_6^{3+} \rightarrow$ electron transfer	2.5×10^9	6.0			p.r.	D.k. in N_2O-satd. 0.01 mol L^{-1} lactate ion.	72A018
24.7	**9,10-Anthraquinone-2,6-disulfonate ion**							
	$CH_3\dot{C}OHCO_2^- + 2,6\text{-}diSO_3AQ^{2-} \rightarrow [2,6\text{-}diSO_3AQ]^{\bullet 3-} + CH_3COCO_2^- + H^+$	3.0×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 5×10^{-3} mol L^{-1} lactate; 58% e-transfer.	751051
24.8	**1,4-Benzoquinone**							
	$CH_3\dot{C}OHCO_2^- + Q \rightarrow Q^{\bullet -} + CH_3COCO_2^- + H^+$	6.5×10^9 $\sim 7.0 \times 10^9$	7.3 10.8			p.r.	P.b.k. in N_2O-satd. soln. contg. lactate; 97% e-transfer.	731052
24.9	**Biacetyl**							
	$CH_3\dot{C}OHCO_2^- + CH_3COCOCH_3 \rightarrow$	2.8×10^7	6.0			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} lactate.	72A018
24.10	**2-Methyl-1,4-naphthoquinone**							
	$CH_3\dot{C}OHCO_2^- + 2\text{-}CH_3NQ \rightarrow$	1.4×10^9	6.5			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. lactate ion; 55% e-transfer.	731047
	$CH_3\dot{C}(O^-)CO_2^- + 2\text{-}CH_3NQ \rightarrow$	1.9×10^9	10.6			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. lactate ion; 72% e-transfer (15% at pH 3.2).	731047
24.11	**Nifuroxime**							
	$CH_3\dot{C}OHCO_2^- + NF \rightarrow NF^{\bullet -} + CH_3COCO_2^- + H^+$	1.5×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} lactate ion; 100% e-transfer.	731099
24.12	**Nitrobenzene**							
	$CH_3\dot{C}OHCO_2^- + C_6H_5NO_2 \rightarrow$	6.5×10^7	6.0			p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} lactate ion.	72A018
24.13	**Cytochrome C**							
	$CH_3\dot{C}OHCO_2^- + Cyt\ C\ (Fe^{3+}) \rightarrow Cyt\ C\ (Fe^{2+}) + CH_3COCO_2^- + H^+$	2.3×10^8 2.5×10^8	7 11			p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} lactate.	751012
		2.4×10^8				p.r.	P.b.k. at 550 nm in soln. contg. lactate.	741007

TABLE 25. Amino(carboxy)methyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
25.1	**Hexaamminecobalt(III) ion**							
	$H_3N^+\dot{C}HCO_2^- + Co(NH_3)_6^{3+} \rightarrow$	$<1.2\times10^7$	5.7			p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} glycine.	72A018
25.2	**Ferricyanide ion**							
	$H_2N\dot{C}HCO_2^- + Fe(CN)_6^{3-} \rightarrow$	1×10^9				p.r.	D.k. at 420 nm in soln. contg. glycine.	761082
25.3	**Oxygen**							
	$H_2N\dot{C}HCO_2^- + O_2 \rightarrow$ $NH_2CH_2(CO_2^-)OO^\bullet$	$\sim1\times10^9$	7.9			p.r.	D.k. at 307 nm in N_2O/O_2 satd. soln. contg. 0.2 mol L^{-1} glycine; also c.k. with ferricyanide.	761082
25.4	**Hexaammineruthenium(III) ion**							
	$H_3N^+\dot{C}HCO_2^- + Ru(NH_3)_6^{3+} \rightarrow$ electron transfer	4.0×10^8	5.7			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} glycine.	72A018
25.5	**9,10-Anthraquinone-2,6-disulfonate ion**							
	$H_2N\dot{C}HCO_2^- + 2,6\text{-}diSO_3AQ^{2-} \rightarrow$ $[2,6\text{-}diSO_3AQ]^{\bullet3-} + HN{=}CHCO_2^- + H^+$	2.6×10^9	8.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine.	731104
25.6	**9,10-Anthraquinone-2-sulfonate ion**							
	$H_2N\dot{C}HCO_2^- + 2\text{-}SO_3AQ^- \rightarrow$ $[2\text{-}SO_3AQ]^{\bullet2-} + HN{=}CHCO_2^- + H^+$	2.2×10^9	8.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine.	731104
25.7	**1,4-Benzoquinone**							
	$H_2N\dot{C}HCO_2^- + Q \rightarrow Q^{\bullet-} +$ $HN{=}CHCO_2^- + H^+$	3.9×10^9	8.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine.	731104
25.8	**Crystal Violet cation**							
	$H_2N\dot{C}HCO_2^- + CV^+ \rightarrow$	1.2×10^9	7			p.r.	D.k. at 525 nm in N_2O-satd. soln. contg. glycine; 56% e-transfer.	731078
25.9	**2,6-Dichloroindophenolate ion**							
	$H_2N\dot{C}HCO_2^- + DCIP^- \rightarrow$	3.6×10^9	7			p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. glycine; 87% e-transfer.	731078
25.10	**2-Hydroxy-1,4-naphthoquinone**							
	$H_2N\dot{C}HCO_2^- + 2\text{-}(OH)NQ \rightarrow$ $2\text{-}(OH)NQ^{\bullet-} + HN{=}CHCO_2^- + H^+$	3.1×10^9	8.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine.	731104
25.11	**Indigodisulfonate ion**							
	$H_2N\dot{C}HCO_2^- + IDS^{2-} \rightarrow$	2.8×10^9	9			p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. glycine; 71% e-transfer.	731078
25.12	**Indigotetrasulfonate ion**							
	$H_2N\dot{C}HCO_2^- + ITS^{4-} \rightarrow$	2.6×10^9	7.0			p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. glycine; 78% e-transfer.	731078
25.13	**Lumiflavine**							
	$H_2N\dot{C}HCO_2^- + LF \rightarrow$	1.8×10^9 3.6×10^8	7 11.2			p.r.	P.b.k. at >500 nm in N_2O-satd. soln. contg. 0.05-0.1 mol L^{-1} glycine.	85A224
25.14	***Methylene Blue* cation**							
	$H_2N\dot{C}HCO_2^- + MB^+ \rightarrow$	3.7×10^9	7			p.r.	D.k. at 580 nm in N_2O-satd. soln. contg. glycine; 86% e-transfer.	731078
25.15	**2-Methyl-1,4-naphthoquinone**							
	$H_2N\dot{C}HCO_2^- + 2\text{-}CH_3NQ \rightarrow$	5.5×10^9	5.4			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycine; 71% e-transfer.	731047
		4.0×10^9	8.0			p.r.	P.b.k. at 395 nm in soln. contg. glycine; 79% e-transfer; also see [731104].	731047

TABLE 25. Amino(carboxy)methyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
25.15	**2-Methyl-1,4-naphthoquinone** — Continued							
		3.8×10^9	6.2			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine; 78% *e*-transfer.	723057
25.16	**1,4-Naphthoquinone-2-sulfonate ion**							
	$H_2N\dot{C}HCO_2^- + 2\text{-}SO_3NQ^- \rightarrow [2\text{-}SO_3NQ]^{\cdot 2-}$	3.3×10^9	8.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine.	731104
25.17	**Nicotinamide adenine dinucleotide**							
	$H_2N\dot{C}HCO_2^- + NAD^+ \rightarrow$	1.5×10^9	6.0			p.r.	P.b.k. in N_2O-satd. soln. contg. glycine.	731104
25.18	**Phenosafranine cation**							
	$H_2N\dot{C}HCO_2^- + PSF^+ \rightarrow$	1.9×10^9	7			p.r.	D.k. at 520 nm in N_2O-satd. soln. contg. glycine; 66% *e*-transfer.	731078
25.19	**Riboflavine**							
	$H_2N\dot{C}HCO_2^- + RF \rightarrow$ electron transfer	2.7×10^9	8.0			p.r.	P.b.k. at 560 nm in N_2O-satd. soln. contg. glycine.	731104
25.20	**Safranine cation**							
	$H_2N\dot{C}HCO_2^- + ST^+ \rightarrow$	1.6×10^9	7			p.r.	D.k. at 520 nm in N_2O-satd. soln. contg. glycine; 60% *e*-transfer.	731078
25.21	**Thionine cation**							
	$H_2N\dot{C}HCO_2^- + Th^+ \rightarrow$	3.2×10^9	8			p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. glycine; 85% *e*-transfer.	731078

TABLE 26. Carbon dioxide radical anion

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.1	**Carbon dioxide radical anion**							
	$^{\bullet}CO_2^- + {}^{\bullet}CO_2^- \rightarrow$	6.5×10^8	7	0.1		p.r.	D.k. at 235 nm, $\varepsilon = 3000\ L\ mol^{-1}\ cm^{-1}$, in soln. contg. 0.1 mol L^{-1} formate.	86A327
		5×10^8	7	0.16	293	p.r.	D.k. at 280 nm in N_2O-satd. soln. contg. 2×10^{-3} mol L^{-1} phosphate-0.16 mol L^{-1} formate buffer; $\varepsilon = 1200\ L\ mol^{-1}\ cm^{-1}$.	86A394
		5×10^8	7.0	0.16		p.r.	D.k. at 285 nm using $\varepsilon = 1000\ L\ mol^{-1}\ cm^{-1}$.	84A153
		3.8×10^8	2.7 13	$\rightarrow 0$		p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; $\varepsilon = 2050\ L\ mol^{-1}\ cm^{-1}$ (1100 at pH 0); $k = 8.5 \times 10^8\ L\ mol^{-1}\ s^{-1}$ at pH 0.	730085
		4.5×10^8	2.8-7			p.r.	D.k. in CO-satd. soln. at 260 nm ($\varepsilon = 2200\ L\ mol^{-1}\ cm^{-1}$) as well as condy. changes; same result in N_2O-satd. soln. contg. formate.	700303
		7.5×10^8	3.1.9	0.5		p.r.	D.k. at 255 nm in N_2O-satd. soln. contg. formate, as well as in CO_2-satd. soln. contg. formate; $\varepsilon_{max} = 3000\ L\ mol^{-1}\ cm^{-1}$ at 235 nm; $k = 8.5 \times 10^8\ L\ mol^{-1}\ s^{-1}$ at pH 13.	690446
		5×10^8	5	$\rightarrow 0$		p.r.	D.k. at 250 nm in CO_2satd. soln. contg. 0.01 mol L^{-1} formate; $\varepsilon = 2250\ L\ mol^{-1}\ cm^{-1}$.	650384
26.2	**Hydrated electron**							
	$^{\bullet}CO_2^- + e_{aq}^- + H_2O \rightarrow HCO_2^- + H^+ + OH^-$	9×10^9	9.15		298	p.r.	D.k. at 670 nm in H_2-satd. soln. contg. 2.3×10^{-4} mol L^{-1} formate and 3×10^{-4} mol L^{-1} borate buffer.	92A377
26.3	**Silver(I) ion**							
	$^{\bullet}CO_2^- + Ag^+ \rightarrow CO_2 + Ag^0$	4×10^9	5.5			p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. formate.	93A166
26.4	**Bismuth(III) ion**							
	$^{\bullet}CO_2H + Bi^{3+} \rightarrow BiCOOH^{3+}$	7×10^4	<0			p.r.	P.b.k. at ~400 nm in Ar-satd. soln. contg. 5 mol L^{-1} $HClO_4$ and formate.	88A493
26.5	**Bicarbonate ion**							
	$^{\bullet}CO_2^- + HCO_3^- \rightarrow HCO_2^- + CO_3^{\bullet -}$	2×10^3				γ-r.	Computer fitting using initial yields of oxalate and formate, as well as transient absorbance, in O_2-free soln. contg. 0.5-1 mol L^{-1} ammonium bicarbonate.	91G058
26.6	**Carbonate radical ion**							
	$^{\bullet}CO_2^- + CO_3^{\bullet -} \rightarrow CO_2 + CO_3^{2-}$	5×10^7				p.r.	D.k. at 250 nm in O_2-free soln. contg. 0.5-1 mol L^{-1} bicarbonate; at low dose mixed kinetics are observed; computer fitting with yields of formate and oxalate in γ-radiolysis.	91G058
26.7	**Cadmium(I) ion**							
	$^{\bullet}CO_2^- + Cd^+ \rightarrow CO_2 + Cd^0$	2×10^9				p.r.	D.k. in deaerated soln. contg. 5×10^{-4} mol L^{-1} $Cd(ClO_4)_2$ and 10^{-3} mol L^{-1} formate.	92N098
26.8	**Cadmium(II) ion**							
	$^{\bullet}CO_2^- + Cd^{2+} \rightarrow CO_2 + Cd^+$	$\sim 10^5$				p.r.	Estd. from increase in Cd^+ in CO_2-satd. soln. contg. 0.1 mol L^{-1} Cd^{2+} and 0.1 mol L^{-1} HCO_2^-.	751027
		5.1×10^6				p.r.	P.b.k. in soln. contg. formate.	751153
26.9	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(I) ion, protonated**							
	$^{\bullet}CO_2^- + N\text{-}rac\text{-}Co(4,11\text{-}dieneN_4)(H)^{2+} \rightarrow$	6×10^9		0.1	298	p.r.	Abs. changes in soln. contg. 0.1 mol L^{-1} formate.	91A513

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.10	**Cobalt(II) ion**							
	$^{\cdot}CO_2^- + Co^{2+} \rightarrow CO_2 + Co^+$	$<10^5$				p.r.	Estd. from lack of increase in Co^+ in soln. contg. 0.1 mol L^{-1} Co^{2+} upon addn. of 0.1 mol L^{-1} formate, as well as γ-r. expts. [730039]; $10^2 < k < 10^5$ L mol^{-1} s^{-1}.	751027
26.11	**2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(II) ion**							
	$^{\cdot}CO_2^- + Co(Me_4tetraeneN_4)^{2+} \rightarrow CO_2 + Co(Me_4tetraeneN_4)^+$	4.7×10^9	6.5	0.1		p.r.	P.b.k. in soln. contg. 0.1 mol L^{-1} formate.	761001
26.12	***N-meso*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$^{\cdot}CO_2^- + N\text{-}meso\text{-}Co(4,11\text{-}dieneN_4)^{2+} \rightarrow N\text{-}meso\text{-}Co(4,11\text{-}dieneN_4)(CO_2)^+$	3×10^9		0.1	298	p.r.	Abs. changes in CO_2-satd. soln. contg. 0.1 mol L^{-1} formate; 80% addn., 20% Co(I) is produced.	91A513
26.13	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$^{\cdot}CO_2^- + N\text{-}rac\text{-}Co(4,11\text{-}dieneN_4)^{2+} \rightarrow sec\text{-}N\text{-}rac\text{-}Co(4,11\text{-}dieneN_4)(CO_2)^+$	8.5×10^8		0.1	298	p.r.	Abs. changes in CO_2-satd. soln. contg. 0.1 mol L^{-1} formate; at 339 K 20-30% Co(I) is produced.	91A513
		$<1 \times 10^7$	6.5	0.1		p.r.	P.b.k.; no reaction obs. in soln. contg. 0.1 mol L^{-1} formate.	761001
26.14	**5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,14-dienecobalt(II) ion**							
	$^{\cdot}CO_2^- + Co(4,14\text{-}dieneN_4)^{2+} \rightarrow CO_2 + Co(4,14\text{-}dieneN_4)^+$	$<1 \times 10^7$	6.5	0.1		p.r.	No reaction obs. in soln. contg. 0.1 mol L^{-1} formate.	761001
26.15	**2,2'-Bipyridinecobalt(II) ion**							
	$^{\cdot}CO_2^- + Co(bpy)^{2+} \rightarrow Co(bpy)CO_2^+$	6.0×10^6		0.2		p.r.	P.b.k.; total k for radical consumption.	85A034
26.16	**Bis(2,2'-bipyridine)cobalt(II) ion**							
	$^{\cdot}CO_2^- + Co(bpy)_2^{2+} \rightarrow Co(bpy)_2CO_2^+$	1.6×10^7		0.2		p.r.	P.b.k.; total k for radical consumption; 70% addn., 30% electron transfer.	85A034
26.17	**Tris(2,2'-bipyridine)cobalt(II) ion**							
	$^{\cdot}CO_2^- + Co(bpy)_3^{2+} \rightarrow Co(bpy)_3^+ + H^+ + CO_2$	3.5×10^7		0.2		p.r.	P.b.k.; total k for radical consumption; also 10% addn.	85A034
26.18	**4,4'-Dimethyl-2,2'-bipyridinecobalt(II) ion**							
	$^{\cdot}CO_2^- + Co(4,4'\text{-}Me_2bpy)^{2+} \rightarrow Co(4,4'\text{-}Me_2bpy)CO_2^+$	1.1×10^7		0.5		p.r.	P.b.k.; total k for radical consumption.	85A034
26.19	**Bis(4,4'-dimethyl-2,2'-bipyridine)cobalt(II) ion**							
	$^{\cdot}CO_2^- + Co(4,4'\text{-}Me_2bpy)_2^{2+} \rightarrow Co(4,4'\text{-}Me_2bpy)_2CO_2^+$	1.1×10^7		0.5		p.r.	P.b.k.; total k for radical consumption.	85A034
26.20	**Tris(4,4'-dimethyl-2,2'-bipyridine)cobalt(II) ion**							
	$^{\cdot}CO_2^- + Co(4,4'\text{-}Me_2bpy)_3^{2+} \rightarrow Co(4,4'\text{-}Me_2bpy)_3^+ + CO_2$	1.7×10^7		0.5		p.r.	P.b.k.; total k for radical consumption; also 40% addn.	85A034
26.21	**3,10,17,24-Tetrasulfophthalocyaninecobalt(II) ion**							
	$^{\cdot}CO_2^- + Co(tspc)^{4-} \rightarrow CO_2 + Co(tspc)^{5-}$	1.5×10^8	3-11	0.1		p.r.	P.b.k. at 460 nm in N_2O-satd. soln. contg. (1-5) $\times 10^{-5}$ mol L^{-1} $Co(pts)^{4-}$ and 0.1 mol L^{-1} formate (substrate present as dimer).	83A238
		2.7×10^8				p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. formate (substrate present as dimer).	82A433
26.22	**Tetrakis(4-sulfonatophenyl)porphinatocobaltate(II) ion**							
	$^{\cdot}CO_2^- + CoTPPS^{4-} \rightarrow CO_2 + CoTPPS^{5-}$	1.7×10^8	8		294	p.r.	D.k. in N_2O-satd. soln. contg. formate.	83A088
		2.6×10^8	13					

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.23	**Nitrilotriacetatocobaltate(II) ion**							
	$CO_2^- + CoNTA^- \rightarrow [CO_2CoNTA]^{2-}$	7.3×10^7	4-7			p.r.	P.b.k. at 260 nm in N_2O-satd. soln. contg. $(1\text{-}50) \times 10^{-4}$ mol L^{-1} CoNTA and 0.2-1 mol L^{-1} formate.	88A343
		7.3×10^7	7	0.2		p.r.	P.b.k. at 270 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	79A255
26.24	**Cobal(II)amin**							
	$^{\bullet}CO_2^- + B12r \rightarrow CO_2 + B12s$	8.2×10^8	9.2	0.1		p.r.	D.k. at 311 and 478 nm as well as p.b.k. at 386 and 280 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	741105
26.25	**Hexaamminecobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_6^{3+} \rightarrow CO_2 + Co(NH_3)_6^{2+}$	1.1×10^8	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
		4.0×10^7	4.8			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate.	72A018
26.26	**Pentaammine(aqua)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5(H_2O)^{3+} \rightarrow CO_2 + Co(NH_3)_5(H_2O)^{2+}$	1.7×10^8	5.2			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.27	**Pentaammine(hydroxy)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5OH^{2+} \rightarrow$	$<3 \times 10^7$	7.8			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.28	**Pentaammine(chloro)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5Cl^{2+} \rightarrow CO_2 + Co(NH_3)_5Cl^+$	1.5×10^8	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.29	**Pentaammine(nitrito-*N*)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5(NO_2)^{2+} \rightarrow$	$<2 \times 10^7$	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.30	**Pentaammine(nitrato-*O*)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5NO_3^{2+} \rightarrow CO_2 + Co(NH_3)_5NO_3^+$	2.1×10^8	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.31	**(Acetato)pentaamminecobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5(OAc)^{2+} \rightarrow CO_2 + Co(NH_3)_5(OAc)^+$	1.1×10^8	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.32	**Pentaammine(phenylacetato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CCH_2C_6H_5^{2+} \rightarrow CO_2 + Co(NH_3)_5O_2CCH_2C_6H_5^+$	7.0×10^7	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.33	**Pentaammine(benzoato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CC_6H_5^{2+} \rightarrow CO_2 + Co(NH_3)_5O_2CC_6H_5^+$	4.5×10^7	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.34	**Pentaammine(4-cyanobenzoato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CC_6H_4\text{-}4\text{-}CN^{2+} \rightarrow CO_2 + Co(NH_3)_5O_2CC_6H_4\text{-}4\text{-}CN^+$	4.6×10^7	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L $mol^{-1}\ s^{-1}$.	731075
26.35	**Pentaammine(2-nitrobenzoato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CC_6H_4\text{-}2\text{-}NO_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CC_6H_4\text{-}2\text{-}NO_2]^{\bullet+}$	2.0×10^9	7	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	771027
26.36	**Pentaammine(3-nitrobenzoato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CC_6H_4\text{-}3\text{-}NO_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CC_6H_4\text{-}3\text{-}NO_2]^{\bullet+}$	1.5×10^9	7	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	771027
26.37	**Pentaammine(4-nitrobenzoato)cobalt(III) ion ($PANBCo^{III}$)**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CC_6H_4\text{-}4\text{-}NO_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CC_6H_4\text{-}4\text{-}NO_2]^{\bullet+}$	1.9×10^9	7	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	771027
26.38	**Pentaammine(2,4-dinitrobenzoato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CC_6H_3\text{-}2,4\text{-}(NO_2)_2^{2+} \rightarrow CO_2 + Co(NH_3)_5O_2CC_6H_3\text{-}2,4\text{-}(NO_2)_2^+$	7.5×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate and (1-3) $\times 10^{-4}$ mol L^{-1} complex.	771027
26.39	**Pentaammine(3,5-dinitrobenzoato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CC_6H_3\text{-}3,5\text{-}(NO_2)_2^{2+} \rightarrow CO_2 + Co(NH_3)_5O_2CC_6H_3\text{-}3,5\text{-}(NO_2)_2^+$	8.1×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate and (1-3) $\times 10^{-4}$ mol L^{-1} complex.	771027
26.40	**Pentaammine(2-nitrophenylacetato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CCH_2C_6H_4\text{-}2\text{-}NO_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CCH_2C_6H_4\text{-}2\text{-}NO_2]^{\bullet+}$	1.3×10^9	7	0.1	298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	86A340
26.41	**Pentaammine(3-nitrophenylacetato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CCH_2C_6H_4\text{-}3\text{-}NO_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CCH_2C_6H_4\text{-}3\text{-}NO_2]^{\bullet+}$	1.5×10^9	7	0.1	298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	86A340
26.42	**Pentaammine(4-nitrophenylacetato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CCH_2C_6H_4\text{-}4\text{-}NO_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CCH_2C_6H_4\text{-}4\text{-}NO_2]^{\bullet+}$	1.4×10^9	7	0.1	298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	86A340
		1.2×10^9	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L $mol^{-1}\ s^{-1}$.	731075
26.43	**Pentaammine(2,4-dinitrophenylacetato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CCH_2C_6H_3\text{-}2,4\text{-}(NO_2)_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CCH_2C_6H_3\text{-}2,4\text{-}(NO_2)_2]^{\bullet+}$	3.9×10^9	7	0.1	298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	86A340
26.44	**Pentaammine(2-nitrocinnamato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}2\text{-}NO_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}2\text{-}NO_2]^{\bullet+}$	1.9×10^9	7	0.1	298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	86A340

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.45	**Pentaammine(3-nitrocinnamato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}3\text{-}NO_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}3\text{-}NO_2]^{\bullet+}$	1.2×10^9	7	0.1	298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	86A340
26.46	**Pentaammine(4-nitrocinnamato)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}4\text{-}NO_2^{2+} \rightarrow CO_2 + [Co(NH_3)_5O_2CCH{=}CHC_6H_4\text{-}4\text{-}NO_2]^{\bullet+}$	1.4×10^9	7	0.1	298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-10) $\times 10^{-5}$ mol L^{-1} complex.	86A340
26.47	**Pentaammine(pyridine)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5(py)^{3+} \rightarrow CO_2 + Co(NH_3)_5(py)^{2+}$	3.3×10^8	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.48	**Pentaammine(pyridinecarboxylato-*O*)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5O_2Cpy^{2+} \rightarrow CO_2 + Co(NH_3)_2O_2Cpy^+$	5×10^7	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.49	**Pentaammine(1-methyl-4,4'-bipyridinium)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(NH_3)_5(mbpy)^{4+} \rightarrow CO_2 + [Co(NH_3)_5(mbpy)]^{\bullet 3+}$	2.4×10^9	7.2	0.1	298	p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	89A115
26.50	**Tris(2,2'-bipyridine)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(bpy)_3^{3+} \rightarrow CO_2 + Co(bpy)_3^{2+}$	7.8×10^9	6.9	0.1		p.r.	P.b.k. at 330 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	79A034
		7.6×10^9	6.9			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + PANBCo^{III}) = 1.9 \times 10^9$ L mol^{-1} s^{-1}.	731075
26.51	**Bis(ethylenediamine)pyrazinecarboxylatocobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(en)_2O_2Cpz^{2+} \rightarrow CO_2 + Co(en)_2O_2Cpz^{2+}$	3×10^9	5.5	0.1	295	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (0.5-5) $\times 10^{-4}$ mol L^{-1} complex.	82A146
26.52	**2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(Me_4tetraeneN_4)^{3+} \rightarrow CO_2 + Co(Me_4tetraeneN_4)^{2+}$	6.4×10^9	2.5			p.r.	P.b.k.	761203
26.53	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(III) ion**							
	$^{\bullet}CO_2^- + N\text{-}rac\text{-}Co(4,11\text{-}dieneN_4)^{3+} \rightarrow CO_2 + N\text{-}rac\text{-}Co(4,11\text{-}dieneN_4)^{2+}$	8.1×10^8	2.5			p.r.	P.b.k.	761203
26.54	**Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion**							
	$^{\bullet}CO_2^- + Co(4,11\text{-}dieneN_4)Cl_2^+ \rightarrow CO_2 + Co(4,11\text{-}dieneN_4)Cl_2$	1.1×10^9	2.5			p.r.	P.b.k.	761203
26.55	**Chlorobis(dimethylglyoximato)(pyridine)cobaltate(III)**							
	$^{\bullet}CO_2^- + Co(dmgH)_2(py)Cl + H_2O \rightarrow CO_2 + C_5H_5N + Cl^- + Co(dmgH)_2(H_2O)$	1.3×10^9	6.6			p.r.	P.b.k. at 460 nm in deoxygenated soln. contg. formate.	94A288
26.56	**Aqua(benzyl)bis(dimethylglyoximato)cobalt(III)**							
	$^{\bullet}CO_2^- + C_6H_5CH_2Co(dmgH)_2(H_2O) \rightarrow$ redn.	3.9×10^7				p.r.	D.k. at 400-450 nm in deoxygenated soln. contg. formate.	94A288
26.57	**Hydroxocob(III)alamin**							
	$^{\bullet}CO_2^- + B12a \rightarrow CO_2 + B12r$	1.5×10^9	9.2			p.r.	D.k. at 350 nm as well as p.b.k. at 310 nm in CO_2-satd. soln. contg. *tert*-BuOH.	741105

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.58	**Cyanocob(III)alamin**							
	$^{\bullet}CO_2^- + B12 \rightarrow$	$<10^7$				p.r.	No abs. change in N_2O or CO_2-satd. soln. contg. 0.1 mol L^{-1} formate, or CO_2-satd. soln. contg. 0.1 mol L^{-1} *tert*-BuOH.	741105
26.59	**Decakis(cyano)-μ-superoxidodicobaltate(III) ion**							
	$^{\bullet}CO_2^- + O_2[Co(CN)_5]_2^{5-} \rightarrow CO_2 + O_2[Co(CN)_5]_2^{6-}$	1.7×10^7	~5.0	0.1		p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	81A009
26.60	**μ-Amido-μ-superoxidooctakisamminedicobalt(III) ion**							
	$^{\bullet}CO_2^- + NH_2[Co(NH_3)_4]_2(O_2)^{4+} \rightarrow CO_2 + NH_2[Co(NH_3)_4]_2(O_2)^{3+}$	5.4×10^9	~5.0	0.1		p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	81A009
26.61	**Hexaamminebis(μ-hydroxy)-μ-(trifluoroacetato)dicobalt(III) ion**							
	$^{\bullet}CO_2^- + CF_3CO_2[Co(NH_3)_3]_2(OH)_2^{3+} \rightarrow CO_2 + CF_3CO_2[Co(NH_3)_3]_2(OH)_2^{2+}$	3.5×10^8				p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	83A140
26.62	**Hexaammine-μ-(difluoroacetato)bis(μ-hydroxy)dicobalt(III) ion**							
	$^{\bullet}CO_2^- + CHF_2CO_2[Co(NH_3)_3]_2(OH)_2^{3+} \rightarrow CO_2 + CHF_2CO_2[Co(NH_3)_3]_2(OH)_2^{2+}$	2.4×10^8				p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	83A140
26.63	**Hexaammine-μ-(fluoroacetato)bis(μ-hydroxy)dicobalt(III) ion**							
	$^{\bullet}CO_2^- + CH_2FCO_2[Co(NH_3)_3]_2(OH)_2^{3+} \rightarrow CO_2 + CH_2FCO_2[Co(NH_3)_3]_2(OH)_2^{2+}$	1.1×10^8				p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	83A140
26.64	**μ-Acetatohexaamminebis(μ-hydroxy)dicobalt(III) ion**							
	$^{\bullet}CO_2^- + CH_3CO_2[Co(NH_3)_3]_2(OH)_2^{3+} \rightarrow CO_2 + CH_3CO_2[Co(NH_3)_3]_2(OH)_2^{2+}$	5.8×10^7				p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	83A140
26.65	**μ-Amido-μ-superoxidotetrakis(ethylenediamine)dicobalt(III) ion**							
	$^{\bullet}CO_2^- + NH_2[Co(en)_2]_2(O_2)^{4+} \rightarrow CO_2 + NH_2[Co(en)_2]_2(O_2)^{3+}$	5.7×10^9	~5.0	0.1		p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	81A009
26.66	**Pentaammineosmium(III)(isonicotinylprolylprolylprolinato)pentaamminecobalt(III) ion**							
	$^{\bullet}CO_2^- + [(NH_3)_5Os^{III}iso(Pro)_3Co^{III}(NH_3)_5]^{5+} \rightarrow CO_2 + [(NH_3)_5Os^{II}iso(Pro)_3Co^{III}(NH_3)_5]^{4+}$	4×10^9		0.1	298	p.r.	P.b.k. at 525 nm in soln. contg. 0.1 mol L^{-1} formate ion.	85A396
26.67	**Chromium(II)**							
	$^{\bullet}CO_2^- + Cr(II) \rightarrow Cr^{III}CO_2^-$	1.1×10^9	1.4			p.r.	D.k. in soln. contg. 1 mol L^{-1} formic acid; product spectrum similar to products containing C-Cr bonds [741146].	731057
26.68	**Chromium(III)**							
	$^{\bullet}CO_2^- + Cr(III) \rightarrow$		1.4			p.r.	No reaction obs. in soln. contg. 1 mol L^{-1} formic acid.	731057
26.69	**Copper(I) ion**							
	$^{\bullet}CO_2^- + Cu^+ \rightarrow CuCO_2$	$>1 \times 10^{10}$	7.3			p.r.	P.b.k. at 480 nm in N_2O-satd. soln. contg. formate.	91A367
26.70	**Copper(II) ion**							
	$^{\bullet}CO_2^- + Cu^{2+} \rightarrow CO_2 + Cu^+$	2×10^9	7.3			p.r.	D.k. at 240 nm in N_2O-satd. soln. contg. 0.005 mol L^{-1} formate.	91A367
		1.5×10^8	6.8	0.1		p.r.	D.k. at 260 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	78A176

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.71	**1,4,8,11-Tetraazacyclotetradecanecopper(II) ion**							
	$^{\bullet}CO_2^- + Cu(cyclam)^{2+} \rightarrow CO_2 + Cu(cyclam)^+$	3×10^9		0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-30) $\times 10^{-5}$ mol L^{-1} $Cu(cyclam)(ClO_4)_2$.	82A320
26.72	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanecopper(II) ion**							
	$^{\bullet}CO_2^- + Cu(Me_6[14]aneN_4)^{2+} \rightarrow CO_2 + Cu(Me_6[14]aneN_4)^+$	2.5×10^9		0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-30) $\times 10^{-5}$ mol L^{-1} $Cu(Me_6[14]aneN_4)(ClO_4)_2$.	82A320
26.73	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecopper(II) ion**							
	$^{\bullet}CO_2^- + Cu(4,11\text{-dieneN}_4)^{2+} \rightarrow CO_2 + Cu(4,11\text{-dieneN}_4)^+$	2.3×10^9	7.0			p.r.	P.b.k. at 410 nm.	761039
26.74	**2,2,4,11,11,13-Hexamethyl-1,5,10,14-tetraazacyclooctadeca-4,13-dienecopper(II) ion**							
	$^{\bullet}CO_2^- + Cu(4,13\text{-dieneN}_4)^{2+} \rightarrow CO_2 + Cu(4,13\text{-dieneN}_4)^+$	4.2×10^9	7.0			p.r.	P.b.k. at ~380 nm in O_2-free soln.	84A292
		5.0×10^7		0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (2-30) $\times 10^{-5}$ mol L^{-1} $Cu(4,13\text{-dieneN}_4)(ClO_4)_2$.	82A320
26.75	**3,10,17,24-Tetrasulfophthalocyaninecopper(II) ion**							
	$^{\bullet}CO_2^- + Cu(tspc)^{4-} \rightarrow CO_2 + Cu(tspc)^{5-}$	1.9×10^8				p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. formate, substrate present as dimer.	82A433
26.76	**Glycylglycylglycinatocopper(II) complex**							
	$^{\bullet}CO_2^- + Cu(Gly_3)^- \rightarrow CO_2 + Cu(Gly_3)^{2-}$	2.8×10^8	9.1			p.r.	D.k. at 550 nm (Cu^{II}) in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate, Cu(II) and gly_3 in 1:5, 1:3 and 1:2 ratio.	761016
26.77	**Copper(II) tetraglycine**							
	$^{\bullet}CO_2^- + Cu(Gly_4)^{2-} \rightarrow CO_2 + Cu(Gly_4)^{3-}$	6.5×10^8	7.3-10	1.0	295	p.r.	P.b.k. in soln. contg. 1 mol L^{-1} formate ion.	80A304
26.78	**Histidinecopper(II) complex**							
	$^{\bullet}CO_2^- + Cu(His)_2 \rightarrow CO_2 + Cu(His)_2^-$	4.1×10^8	11.0			p.r.	D.k. at 600 nm (Cu^{II}) in N_2O-satd. soln. contg. formate.	771138
26.79	**Glycylhistidinecopper(II) complex**							
	$^{\bullet}CO_2^- + Cu(GlyHis) \rightarrow CO_2 + Cu(GlyHis)^-$	4.5×10^8 1.6×10^7	6.6 11.0			p.r.	D.k. at 565 nm (Cu^{II}) in N_2O-satd. soln. contg. formate.	771138
26.80	**β-Alanylhistidinecopper(II) complex**							
	$^{\bullet}CO_2^- + Cu(\beta\text{-AlaHis}) \rightarrow CO_2 + Cu(\beta\text{-AlaHis})^-$	3.5×10^8	7.5-11			p.r.	D.k. at 600 nm (Cu^{II}) in N_2O-satd. soln. contg. formate.	771138
26.81	**Bis(D-penicillamine)copper(II)**							
	$^{\bullet}CO_2^- + Cu^{II}(D\text{-Pen})_2 \rightarrow CO_2 + Cu^{I}(D\text{-Pen})_2$	1.2×10^8	10, 12	0.05	296	p.r.	D.k. at 335 nm in N_2O-satd. soln. contg. (2.5-10) $\times 10^{-5}$ mol L^{-1} bis(penicillamine)copper(II).	91A119
26.82	**Glutathionecopper(II), oxidized**							
	$^{\bullet}CO_2^- + Cu^{II}(GSSG)_n \rightarrow CO_2 + Cu^{I}(GSSG)_n$	1.0×10^8	11			p.r.	D.k. at 595 nm (Cu^{II}) in N_2O-satd. soln. contg. formate ion; 10% of the $^{\bullet}CO_2^-$ reacted with the disulfide → $GSSG^-$ (p.b.k. at 410 nm).	761016
26.83	***Bleomycin-copper(II) complex***							
	$^{\bullet}CO_2^- + BLM\text{-}Cu(II) \rightarrow CO_2 + BLM\text{-}Cu(I)$	6.7×10^8	7			p.r.	P.b.k. at 365 nm in N_2O-satd. soln. contg. 0.02 mol L^{-1} formate and 2×10^{-4} mol L^{-1} bleomycin-copper complex; intermediate suggested to be $BLM\text{-}CuCO_2^+$.	87A184

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.84	**Europium(III) ion**							
	$^{\bullet}CO_2^- + Eu(III) \rightarrow CO_2 + Eu(II)$	$>7 \times 10^6$	1.4			p.r.	Estd. from p.b.k. at 250 nm (Eu^{II}).	731057
26.85	**Nitrilotriacetatoferrate(II) ion**							
	$^{\bullet}CO_2^- + FeNTA^- \rightarrow CO_2FeNTA^{2-}$	2×10^7			293	p.r.	Abs. changes in N_2O-satd. soln. contg. formate; $\Delta V^{\ddagger} = -1.3\ cm^3\ mol^{-1}$, P range not given.	94A367
		1.7×10^7	7	0.1		p.r.	P.b.k. at 405 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion; $k = 1.5 \times 10^7\ L\ mol^{-1}\ s^{-1}$ by c.k. rel. to $k(CO_2^- + Co(NH_3)_6^{3+}) = 4 \times 10^7\ L\ mol^{-1}\ s^{-1}$; $k_r = 140\ s^{-1}$.	88A184
26.86	***N*-(2-Hydroxyethyl)ethylenediaminetriacetatoferrate(II) ion**							
	$^{\bullet}CO_2^- + FeHEDTA^- \rightarrow CO_2FeHEDTA^{2-}$	1.0×10^7	7	0.1		p.r.	P.b.k. at 420 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion; $k = 6.2 \times 10^6\ L\ mol^{-1}\ s^{-1}$ by c.k. rel. to $k(CO_2^- + Co(NH_3)_6^{3+}) = 4 \times 10^7\ L\ mol^{-1}\ s^{-1}$; $k_r = 25\ s^{-1}$.	88A184
26.87	**Iron(II) protoporphyrin**							
	$^{\bullet}CO_2^- + Fe(II)PP \rightarrow CO_2 + Fe(I)PP$	8×10^7	10.0	0.1		p.r.	Pseudo-first-order reaction obs. in N_2O-satd. soln. contg. $(2\text{-}10) \times 10^{-5}$ mol L^{-1} Fe(II)PP and 0.1 mol L^{-1} formate ion.	85A006
26.88	**Ferricyanide ion**							
	$^{\bullet}CO_2^- + Fe(CN)_6^{3-} \rightarrow CO_2 + Fe(CN)_6^{4-}$	7.0×10^8	6.0, 11.0	0.1		p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	83A091
		1.1×10^9	7	0.3		p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} formate ion; ionic strength effects reported.	690522
26.89	**Pentacyano(nitrosyl)ferrate(III) ion**							
	$^{\bullet}CO_2^- + Fe(CN)_5(NO)^{2-} \rightarrow CO_2 + Fe(CN)_5NO^{3-}$	4.0×10^8	7.0	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	771120
		3.7×10^8	7	0.02		p.r.	P.b.k. at 450 nm in N_2O-satd. 0.02 mol L^{-1} formate soln.	690052
26.90	**Nitrilotriacetatoferrate(III)**							
	$^{\bullet}CO_2^- + FeNTA \rightarrow CO_2 + FeNTA^-$	5.5×10^7	7	0.1		p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion; rel. to $k(^{\bullet}CO_2^- + [CO_2FeNTA]^{2-}) = 1.9 \times 10^7\ L\ mol^{-1}\ s^{-1}$.	88A184
26.91	**Carboxylato(nitrilotriacetato)ferrate(III) ion**							
	$^{\bullet}CO_2^- + CO_2FeNTA^{2-} + H^+ + H^+ \rightarrow CO + CO_2 + FeNTA + H_2O$	1.9×10^7	7	0.1		p.r.	Calcd. from d.k. at 410 nm in soln. contg. 0.1 mol L^{-1} formate, 0.006 mol L^{-1} NTA and Fe^{2+} and c.k. rel. to $k(CO_2^- + Co(NH_3)_6^{3+}) = 4 \times 10^7\ L\ mol^{-1}\ s^{-1}$.	88A184
26.92	**Ethylenediaminetetraacetatoferrate(III) ion**							
	$^{\bullet}CO_2^- + FeEDTA^- \rightarrow CO_2 + FeEDTA^{2-}$	5×10^7	3.8-10		295	p.r.	D.k. at 300 and 325 nm in O_2-satd. soln. contg. formate ion.	771088
26.93	***N*-(2-Hydroxyethyl)ethylenediaminetriacetatoferrate(III)**							
	$^{\bullet}CO_2^- + FeHEDTA \rightarrow CO_2 + FeHEDTA$	8.3×10^7	7	0.1		p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion, rel. to $k(^{\bullet}CO_2^- + CO_2FeHEDTA^{2-}) = 4.5 \times 10^6\ L\ mol^{-1}\ s^{-1}$.	88A184
26.94	**Carboxylato(2-hydroxyethylethylenediaminetriacetato)ferrate(III) ion**							
	$^{\bullet}CO_2^- + CO_2FeHEDTA^{2-} + H^+ + H^+ \rightarrow CO + CO_2 + FeHEDTA^- + H_2O$	4.5×10^6	7	0.1		p.r.	Calcd. from d.k. at 420 nm in soln. contg. 0.1 mol L^{-1} formate. 0.006 mol L^{-1} HEDTA and Fe^{2+} and c.k. rel. to $k(CO_2^- + Co(NH_3)_6^{3+}) = 4 \times 10^7\ L\ mol^{-1}\ s^{-1}$.	88A184

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.95	**Diethylenetriaminepentaacetatoferrate(III) ion**							
	$^{\bullet}CO_2^- + FeDTPA^{2-} \rightarrow CO_2 + FeDTPA^{3-}$	1×10^8	9-12	0.1		p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate, 0.001 mol L^{-1} DTPA and 2×10^{-4} mol L^{-1} Fe^{3+}; $K(FeDTPA^{2-} + OH^-) = 4 \times 10^3$ L mol^{-1}.	89A135
26.96	**Diethylenetriaminepentaacetato(hydroxy)ferrate(III) ion**							
	$^{\bullet}CO_2^- + FeDTPA(OH)^{3-} \rightarrow CO_2 + FeDTPA^{3-} + OH^-$	1×10^7	9-12	0.1		p.r.	D.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate, 0.001 mol L^{-1} DTPA and 2×10^{-4} mol L^{-1} Fe^{3+}.	89A135
26.97	**Ethylenediaminebis[2-(2-hydroxyphenyl)acetato]iron(III) ion**							
	$^{\bullet}CO_2^- + FeEHPG^+ \rightarrow CO_2 + FeEHPG$	7.3×10^6	7.0			p.r.	D.k. at 475 nm in N_2O-satd. soln. contg. formate ion.	87A281
26.98	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatoiron(III) ion**							
	$^{\bullet}CO_2^- + FeTMpyP^{5+} \rightarrow CO_2 + FeTMpyP^{4+}$	1.6×10^{10}	8.5-9.5	0.01		p.r.	Abs. changes at 497 and 562 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate.	91A380
		1.3×10^{10}	8	0.05		p.r.	D.k. in N_2O-satd. soln. contg. 0.05 mol L^{-1} formate ion.	86A118
		4.0×10^9	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	84A426
		7.5×10^9	5.6-8.3	0.1		p.r.	D.k. at 420 as well as p.b.k. at 445 and 560 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} HCO_2^-.	82A119
		7.1×10^9	7.8	0.05	298	p.r.	P.b.k. at 580 nm as well as d.k. at 350 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} formate.	81A207
26.99	**Dicyanotetrakis(1-methylpyridinium-4-yl)porphineiron(III) ion**							
	$^{\bullet}CO_2^- + FeTMpyP(CN)_2^{3+} \rightarrow CO_2 + FeTMpyP(CN)_2^{2+}$	5×10^9	10.1	0.1		p.r.	D.k. at 435 as well as p.b.k. at 470 nm in soln. contg. 2.0×10^{-3} mol L^{-1} KCN and $(1\text{-}5) \times 10^{-5}$ mol L^{-1} Fe^{III} complex.	82A119
26.100	**Tetraakis(1-methylpyridinium-4-yl)porphineiron(III)-diimidazole complex**							
	$^{\bullet}CO_2^- + FeTMpyP(Im)_2^{5+} \rightarrow CO_2 + FeTMpyP(Im)_2^{4+}$	6×10^8	9.1	0.5		p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} formate and 0.02 mol L^{-1} imidazole.	82A119
26.101	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphineiron(III)-dihistidine complex**							
	$^{\bullet}CO_2^- + FeTMpyP(His)_2^{5+} \rightarrow CO_2 + FeTMpyP(His)_2^{4+}$	2×10^8	8.0	0.5		p.r.	P.b.k.	82A119
26.102	**5,10,15,20-Tetrakis[4-(*N,N,N*-trimethylammonio)phenyl]porphinatoiron(III) ion**							
	$^{\bullet}CO_2^- + FeTAPP^{5+} \rightarrow CO_2 + FeTAPP^{4+}$	3.7×10^9	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	84A426
26.103	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatoferrate(III) ion**							
	$^{\bullet}CO_2^- + FeTPPS^{3-} \rightarrow CO_2 + FeTPPS^{4-}$	1.8×10^9	5	0.05		p.r.	D.k. in N_2O-satd. soln. contg. 0.05 mol L^{-1} formate ion.	86A118
		1.5×10^9	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	84A426
26.104	**Tetrakis(4-sulfonatophenyl)porphinatoferrate(III) ion, μ-oxo-dimer**							
	$^{\bullet}CO_2^- + (TPPS)Fe\ O\ Fe(TPPS)^{8-} \rightarrow CO_2 + (TPPS)Fe^{III}\text{-}O\text{-}Fe^{II}(TPPS)^{9-}$	$\sim 2 \times 10^9$	9			p.r.	D.k. in N_2O-satd. soln. contg. 0.05 mol L^{-1} formate ion.	86A118
26.105	**3,10,17,24-Tetrasulfophthalocyanineiron(III) ion**							
	$^{\bullet}CO_2^- + Fe(tspc)^{3-} \rightarrow CO_2 + Fe(tspc)^{4-}$	3.4×10^8				p.r.	P.b.k. at 500-520 nm in N_2O-satd. soln. contg. formate, substrate present as dimer.	82A433
26.106	**α,α,α,β-Tetrakis(*N*-methylisonicotinamidophenyl)porphinatoiron(III) ion**							
	$^{\bullet}CO_2^- + FePFP^{5+} \rightarrow CO_2 + FePFP^{4+}$	5.9×10^9	6-8	0.1		p.r.	D.k. at 420 nm (Fe^{III}) as well as p.b.k. at 440 nm (Fe^{II}) in soln. contg. $(5\text{-}50) \times 10^{-6}$ mol L^{-1} Fe^{III} and 0.1 mol L^{-1} formate.	86A154

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.107	**Dicyano-α,α,α,β-tetrakis(*N*-methylisonicotinamidophenyl)porphinatoiron(III) ion**							
	$^{\bullet}CO_2^- + FePFP(CN)_2^{3+} \rightarrow CO_2 + FePFP(CN)_2^{2+}$	3.9×10^9	10.2			p.r.	D.k. at 420 nm (Fe^{III}) as well as p.b.k. at 440 nm (Fe^{II}) in soln, contg. (10-50) $\times 10^{-6}$ mol L^{-1} Fe^{III}, 10^{-3} mol L^{-1} carbonate, 5×10^{-4} mol L^{-1} KCN and 0.1 mol L^{-1} formate.	86A154
26.108	**Bis(1-methylimidazole)-α,α,α,β-tetrakis(*N*-methylisonicotinamidophenyl)porphinatoiron(III) ion**							
	$^{\bullet}CO_2^- + FePFP(1\text{-}MeIm)_2^{5+} \rightarrow CO_2 + FePFP(1\text{-}MeIm)_2^{4+}$	3.1×10^9	6-8	0.1		p.r.	P.b.k. at 434 nm (Fe^{II}) in N_2O-satd. soln. contg. (5-50) $\times 10^{-6}$ mol L^{-1} Fe^{III}, 0.1 mol L^{-1} formate and 3.4×10^{-2} mol L^{-1} ligand (pK_a 1-MeIm = 7.0).	86A154
26.109	**Hemin c**							
	$^{\bullet}CO_2^- + Hem\text{-}Fe^{III} \rightarrow CO_2 + Hem\text{-}Fe^{II}$	1.3×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.02 mol L^{-1} formate.	75A241
26.110	**Bleomycin-iron(III) complex**							
	$^{\bullet}CO_2^- + BLM\text{-}Fe(III) \rightarrow CO_2 + BLM\text{-}Fe(II)$	1.9×10^8	7			p.r.	D.k. at 365 nm, as well as 403 and 435 nm, in N_2O-satd. soln. contg. 0.02 mol L^{-1} formate.	87A501
26.111	**Ferrate(VI) ion**							
	$^{\bullet}CO_2^- + FeO_4^{2-} \rightarrow CO_2 + FeO_4^{3-}$	3.5×10^8	9.5-10.5		297	p.r.	D.k. at 510 nm in N_2O-satd. soln. contg. 0.02 mol L^{-1} formate, 4×10^{-5} mol L^{-1} diethylenetriaminepentaacetate ion; same results at pH 12.3.	87A381
26.112	**Mercury(II) cyanide**							
	$^{\bullet}CO_2^- + Hg(CN)_2 \rightarrow CO_2 + Hg(I)$	3.4×10^9				p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate.	751203
26.113	**Mercury(II) iodide**							
	$^{\bullet}CO_2^- + HgI_2 \rightarrow CO_2 + Hg(I)$	3.0×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	78A165
26.114	**Iodine**							
	$^{\bullet}CO_2^- + I_2 \rightarrow CO_2 + I_2^{\bullet -}$	7×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate, 1.5×10^{-4} mol L^{-1} I_2 and 10^{-4} mol L^{-1} I^-.	86A070
26.115	**Hypoiodous acid**							
	$^{\bullet}CO_2^- + HOI \rightarrow CO_2 + HOI^-$	5.7×10^8	9			p.r.	P.b.k. ($HOI^- \rightarrow OH^- + I^{\bullet} \rightarrow I_2^-$) in soln. contg. formate ion, I^-, and 0.01 mol L^{-1} borax buffer.	86A901
26.116	**Iodate ion**							
	$^{\bullet}CO_2^- + IO_3^- \rightarrow CO_2 + IO_3^{2-}$	8.1×10^7	8.8			p.r.	P.b.k. at 490 nm in N_2O-satd. soln. contg. 1.0 mol L^{-1} formate.	94A107
	$^{\bullet}CO_2^- + IO_3^- \rightarrow CO_2 + HOIO_2^-$	1.3×10^8		0.1		p.r.	P.b.k. at 480 nm in N_2O-satd. soln. contg. 2 or 4×10^{-3} mol L^{-1} IO_3^- and 0.1 mol L^{-1} formate ion.	85A037
26.117	**Indium(III) ion**							
	$^{\bullet}CO_2^- + In^{3+} \rightarrow$	$<1 \times 10^4$	2			p.r.	No reaction obs.	83A206
26.118	**Hexachloroiridate(IV) ion**							
	$^{\bullet}CO_2^- + IrCl_6^{2-} \rightarrow CO_2 + IrCl_6^{3-}$	1.7×10^9	6-7			p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. formate.	82A041
26.119	**Manganese(II) ion**							
	$^{\bullet}CO_2^- + Mn^{2+} \rightarrow CO_2 + Mn^+$	$<2 \times 10^5$				p.r.	No effect of Mn^{2+} on d.k. of $^{\bullet}CO_2^-$ at 280 or 256 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate.	761109

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.120	**5,10,15,20-Tetrakis(1-methylpyridinium-4-yl)porphinatomanganese(III) ion**							
	$^{\bullet}CO_2^- + MnTMpyP^{5+} \rightarrow CO_2 + MnTMpyP^{4+}$	5.5×10^9 5.0×10^9	6.7 9.3			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm in soln. contg. 0.01 mol L^{-1} formate ion; pK_a = 8.0, 10.6.	86A313
		3.5×10^9	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	84A426
26.121	**5,10,15,20-Tetrakis[4-(*N,N,N*-trimethylammonio)phenyl]porphinatomanganese(III) ion**							
	$^{\bullet}CO_2^- + MnTAPP^{5+} \rightarrow CO_2 + MnTAPP^{4+}$	4.2×10^9 3.6×10^9	7-9 11			p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm in soln. contg. 0.01 mol L^{-1} formate ion; pK_a = 8.2, 10.8.	86A313
26.122	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(III) ion**							
	$^{\bullet}CO_2^- + MnTPPS^{3-} \rightarrow CO_2 + MnTPPS^{4-}$	4.2×10^9	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	84A426
26.123	**α,α,α,β-Tetrakis[2-(*N*-methylisonicotinamido)phenyl]porphinatomanganese(III) ion**							
	$^{\bullet}CO_2^- + MnPFP^{5+} \rightarrow CO_2 + MnPFP^{4+}$	6.0×10^9	7.0	0.01		p.r.	D.k. at 465 nm, as well as p.b.k. at 440 nm in soln. contg. 0.01 mol L^{-1} formate ion.	86A313
26.124	**Nitrous oxide**							
	$^{\bullet}CO_2^- + N_2O + H_2O \rightarrow CO_2 + N_2 + {}^{\bullet}OH + OH^-$	1.6×10^3	4.4	0.1	292	γ-r.	Calcd. from $G(CO_2)$ vs. dose rate; N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion; chain reaction; used $2k(^{\bullet}CO_2^- + {}^{\bullet}CO_2^-) = 1.3 \times 10^9$ $L\ mol^{-1}\ s^{-1}$.	85G029
26.125	**Nitric oxide**							
	$^{\bullet}CO_2^- + {}^{\bullet}NO \rightarrow NOCO_2^-$	2.9×10^9	6.7		296	p.r.	D.k. 250 nm in soln. contg. 1.3×10^{-5} mol L^{-1} N_2O, NO and 0.01 mol L^{-1} formate.	94A457
26.126	**Nickel(I) ion**							
	$^{\bullet}CO_2^- + Ni^+ \rightarrow NiCO_2$	6.6×10^9	5.0			p.r.	D.k. at 300 nm (as well as p.b.k.) in soln. contg. $NiSO_4$ and formate ion.	741037
26.127	**Nickel(II) ion**							
	$^{\bullet}CO_2^- + Ni^{2+} \rightarrow CO_2 + Ni^+$	$<10^5$				p.r.	Estd. from lack of increase in Ni^+ in soln. contg. 0.1 mol L^{-1} Ni^{2+} on addn. of 0.1 mol L^{-1} formate ion, as well as γ-r. experiments [730039]. $10^2 < k < 10^5$ $L\ mol^{-1}\ s^{-1}$.	751027
26.128	**1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CO_2^- + Ni(cyclam)^{2+} \rightarrow CO_2Ni(cyclam)^+ \rightleftarrows CO_2 + Ni(cyclam)^+$	6.7×10^9	4.3		295	f.p.	P.b.k. at 380 nm in Ar-satd. soln. contg. 0.01 mol L^{-1} oxalate and $(1\text{-}8) \times 10^{-4}$ mol L^{-1} $Ni(cyclam)^{2+}$; $\Delta H^{\ddagger} = 25$ kJ mol^- and $\Delta S^{\ddagger} = 25\ J\ K^{-1}\ mol^{-1}$, studied at 275-323 K.	95A154
		5.2×10^9	6.0	0.1		p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} formate and $(1\text{-}10) \times 10^{-4}$ mol L^{-1} $Ni(cyclam)^{2+}$.	85A032
26.129	**Tetracyanonickelate(II) ion**							
	$^{\bullet}CO_2^- + Ni(CN)_4^{2-} \rightarrow CO_2 + Ni(CN)_4^{3-}$	1.2×10^9		0.1		p.r.	P.b.k. at 240 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion and 5, 10 and 48×10^{-5} mol L^{-1} $Ni(CN)_4^{2-}$.	741072
26.130	**1,4,7,10-Tetraazacyclotridecanenickel(II) ion**							
	$^{\bullet}CO_2^- + Ni([13]aneN_4)^{2+} \rightarrow CO_2 + Ni([13]aneN_4)^+$	1.7×10^9	5.5	0.1		p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} formate ion and $1\text{-}10 \times 10^{-4}$ mol L^{-1} $Ni([13]aneN_4)^{2+}$.	85A145
26.131	**1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CO_2^- + Ni(Me_4[14]aneN_4)^{2+} \rightarrow CO_2 + Ni(Me_4[14]aneN_4)^+$	1.5×10^9	6.0	0.1		p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} formate and $(1\text{-}10) \times 10^{-4}$ mol L^{-1} $Ni(Me_4[14]aneN_4)^{2+}$.	85A032

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.132	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CO_2^- + Ni(Me_6[14]aneN_4)^{2+} \rightarrow CO_2 + Ni(Me_6[14]aneN_4)^+$	5.7×10^9	7.0	0.1		p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} formate; Ni(I) is also formed by reaction of e_{aq}^-.	761039
26.133	**5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienenickel(II) ion**							
	$^{\bullet}CO_2^- + Ni(4,11\text{-}dieneN_4)^{2+} \rightarrow CO_2 + Ni(4,11\text{-}dieneN_4)^+$	6.7×10^9	7.0	0.1		p.r.	P.b.k. in Ar-satd. 0.1 mol L^{-1} formate.	761039
26.134	**1,4,5,7,7,8,11,12,14,14-Decamethyl-1,4,8,11-tetraazacyclotetradecanenickel(II) ion**							
	$^{\bullet}CO_2^- + Ni(Me_{10}cyclam)^{2+} \rightarrow CO_2 + Ni(Me_{10}cyclam)^+$	4×10^6	6.0	0.1		p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} formate and $(1\text{-}10) \times 10^{-4}$ mol L^{-1} complex.	85A032
26.135	**3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonickel(IV) ion**							
	$^{\bullet}CO_2^- + Ni^{IV}L^{2+} \rightarrow CO_2 + [Ni^{III}L]^+$	1.2×10^{10}	2.2-4.1			p.r.	P.b.k.	85A354
26.136	**Hydrogen peroxide**							
	$^{\bullet}CO_2^- + H_2O_2 \rightarrow CO_2 + {}^{\bullet}OH + OH^-$	6×10^5			298	p.r.	D.k. at 270 nm in CO_2-satd. soln. contg. 0.025 mol L^{-1} MeOH in absence and presence of 0.01 mol L^{-1} H_2O_2; $E_a = 21$ kJ mol^{-1}, studied at 298-337 K.	92A377
		7.3×10^5	6.8			γ-r.	Obs. $G(H_2O_2)$ in N_2O-satd. soln. contg. formate ion; used $2k(^{\bullet}CO_2^- + {}^{\bullet}CO_2^-) = 1.5 \times 10^9$ L $mol^{-1}\ s^{-1}$.	87G036
		$\leq 7 \times 10^5$	7			phot.	Calcd. from assumed chain mechanism in $CO\text{-}H_2O_2$ soln.; recalcd. in [745144]; used $2k(^{\bullet}CO_2^- + {}^{\bullet}CO_2^-) = 1.5 \times 10^9$ L $mol^{-1}\ s^{-1}$.	637005
26.137	**Oxygen**							
	$^{\bullet}CO_2^- + O_2 \rightarrow CO_2 + O_2^{\bullet -}$	2.0×10^9	8.0	0.1		p.r.	P.b.k. at 260 nm in O_2-satd. soln. contg. 0.1 mol L^{-1} formate.	761072
		4.2×10^9	6.8	0.18		p.r.	D.k. at 270 nm and 300 nm in soln. contg. 0.18 mol L^{-1} formate ion.	761132
		2.4×10^9	7	0.3		p.r.	C.k. in soln. contg. 0.3 mol L^{-1} formate; rel. to $k(^{\bullet}CO_2^- + Fe(CN)_6^{3-}) = 1.1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	690522
26.138	**Lead(II) ions**							
	$^{\bullet}CO_2^- + Pb^{2+} \rightarrow CO_2 + Pb^+$	1×10^{10}				p.r.	P.b.k. at 320 nm in N_2O-satd. soln. contg. $(0.7\text{-}2) \times 10^{-4}$ mol L^{-1} $Pb(ClO_4)_2$ and 2×10^{-3} mol L^{-1} formate ion.	92A206
		2.6×10^8	3.9	0.05		p.r.	P.b.k. at 330 nm in soln. contg. 0.05 mol L^{-1} formate ion.	82A425
26.139	**Palladium(II) ion**							
	$^{\bullet}CO_2H + Pd^{2+} \rightarrow PdCO_2H^+ \rightarrow Pd^+ + H^+ + CO_2$	4.0×10^7	0			p.r.	P.b.k. at 290 nm in soln. contg. 0.1-1 mol L^{-1} formic acid, $(5\text{-}30) \times 10^{-5}$ mol L^{-1} Pd^{2+} and 1 mol L^{-1} $HClO_4$.	94A518
		3.0×10^7	0			p.r.	P.b.k. at 290 nm in soln. contg. formic acid, $(5\text{-}30) \times 10^{-5}$ mol L^{-1} Pd^{2+} and 1 mol L^{-1} $HClO_4$.	94A210
26.140	**Tris(2,2'-bipyridine)rhodium(III) ion**							
	$^{\bullet}CO_2^- + Rh(bpy)_3^{3+} \rightarrow CO_2 + Rh(bpy)_3^{2+}$	6.2×10^9	7	0.1		p.r.	P.b.k. at 270 nm as well as d.k. at 320 and 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	81A134

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.141	**Tris(2,2'-bipyridine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpy)_3^{2+} \rightarrow CO_2 + Ru(bpy)_3^{+}$	6.0×10^7	3-10	0.15		p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A081
26.142	**Bis(2,2'-bipyridine)(2,2'-bipyrimidine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpy)_2(bpm)^{2+} \rightarrow CO_2 + Ru(bpy)_2(bpm)^{+}$	2.5×10^9	3-10	0.15		p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A081
26.143	**(2,2'-Bipyrazine)bis(2,2'-bipyridine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpy)_2(bpz)^{2+} \rightarrow CO_2 + Ru(bpy)_2(bpz)^{+}$	4.8×10^9	3-10	0.15		p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A081
26.144	**Tris(2,2'-bipyrimidine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpm)_3^{2+} \rightarrow CO_2 + Ru(bpm)_3^{+}$	6.7×10^9	3,0, 7.0, 13.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion and $(2.5\text{-}10) \times 10^{-5}$ mol L^{-1} $Ru(bpm)_3^{2+}$.	89A280
26.145	**(2,2'-Bipyridine)bis(2,2'-bipyrimidine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpm)_2(bpy)^{2+} \rightarrow CO_2 + Ru(bpm)_2(bpy)^{+}$	4.7×10^9	3-10	0.15		p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A081
26.146	**(2,2'-Bipyrazine)bis(2,2'-bipyrimidine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpm)_2(bpz)^{2+} \rightarrow CO_2 + Ru(bpm)_2(bpz)^{+}$	6.8×10^9	3-10	0.15		p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A081
26.147	**(2,2'-Bipyrazine)(2,2'-bipyridine)(2,2'-bipyrimidine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpy)(bpm)(bpz)^{2+} \rightarrow CO_2 + Ru(bpy)(bpm)(bpz)^{+}$	6.0×10^9	3-10	0.15		p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A081
26.148	**Tris(2,2'-bipyrazine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpz)_3^{2+} \rightarrow CO_2 + Ru(bpz)_3^{+}$	1.3×10^{10}	3-11	0.1		p.r.	P.b.k. at ~360 and 490 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	86A422
26.149	**Bis(2,2'-bipyrazine)(2,2'-bipyrimidine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpz)_2(bpm)^{2+} \rightarrow CO_2 + Ru(bpz)_2(bpm)^{+}$	8.4×10^9	3-10	0.15		p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A081
26.150	**Bis(2,2'-bipyrazine)(2,2'-bipyridine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpz)_2(bpy)^{2+} \rightarrow CO_2 + Ru(bpz)_2(bpy)^{+}$	6.4×10^9	3-10	0.15		p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A081
26.151	**Bis(2,2'-bipyridine)(dipyrido[3,2-*a*:2',3'-*c*]phenazine)ruthenium(II) ion**							
	$^{\bullet}CO_2^- + Ru(bpy)_2(dppz)^{2+} \rightarrow CO_2 + Ru(bpy)_2(dppz)^{+}$	3.3×10^9	2-13			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion and $(2.5\text{-}10) \times 10^{-5}$ mol L^{-1} $Ru(bpy)_2(dppz)^{2+}$; product may be singly or doubly protonated ($pK_a = 4, 10$).	89A312
26.152	**Hexaammineruthenium(III) ion**							
	$^{\bullet}CO_2^- + Ru(NH_3)_6^{3+} \rightarrow CO_2 + Ru(NH_3)_6^{2+}$	2.0×10^9	4.8			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate.	72A018
26.153	**Pentaammine(nitroso)ruthenium(III) ion**							
	$^{\bullet}CO_2^- + Ru(NH_3)_5NO^{3+} \rightarrow CO_2 + Ru(NH_3)_5NO^{2+}$	3.1×10^9	6.6	0.5		p.r.	P.b.k. at 280 nm in N_2O-satd. soln. contg. 0.5 mol L^{-1} formate ion.	751049
26.154	**Pentaammine(isonicotinamide)ruthenium(III) ion**							
	$^{\bullet}CO_2^- + Ru(NH_3)_5isn^{3+} \rightarrow CO_2 + Ru(NH_3)_5isn^{2+}$	1.0×10^{10}	4.9	0.1	296	p.r.	P.b.k. at 480 nm in N_2O-satd. soln. contg. formate.	80A317
26.155	**Pentaammine(1-methyl-4,4'-bipyridinium)ruthenium(III) ion**							
	$^{\bullet}CO_2^- + Ru(NH_3)_5(mbpy)^{4+} \rightarrow CO_2 + Ru(NH_3)_5(mbpy)^{3+}$	1.1×10^{10}	6.2	0.1		p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	89A115

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.156	**Decaamminebis(2,2'-bipyridine)bis[μ-(cyano))]triruthenium(III),(II),(III) ion**							
	$^{\bullet}CO_2^- + [3,2,3] \rightarrow CO_2 + [2,2,3] + [3,2,2]$	1.4×10^{10}	7			p.r.	P.b.k., or d.k., in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion and (5-10) $\times 10^{-5}$ mol L^{-1} [3,2,3].	89A024
26.157	**Nonaamminebis(2,2'-bipyridine)bis[μ-(cyano))](pyridine)triruthenium(III),(II),(III) ion**							
	$^{\bullet}CO_2^- + [3',2,3] \rightarrow CO_2 + [2',2,3] + [3',2,2]$	1.5×10^{10}	7			p.r.	P.b.k., or d.k., in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion and (5-10) $\times 10^{-5}$ mol L^{-1} [3',2,3].	89A024
26.158	**Octaamminebis(2,2'-bipyridine)bis[μ-(cyano))]bis(pyridine)triruthenium(III),(II),(III) ion**							
	$^{\bullet}CO_2^- + [3',2,3'] \rightarrow CO_2 + [2',2,3'] + [3',2,2']$	1.3×10^{10}	7			p.r.	P.b.k., or d.k., in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion and (5-10) $\times 10^{-5}$ mol L^{-1} [3',2,3'].	89A024
26.159	**Sulfur dioxide**							
	$^{\bullet}CO_2^- + SO_2 \rightarrow CO_2 + SO_2^{\bullet-}$	7.6×10^8	3.1			p.r.	Abs. changes in soln. contg. 1 mol L^{-1} formate; used $2k(^{\bullet}CO_2^- + {}^{\bullet}CO_2^-) = 7.6 \times 10^8$ L $mol^{-1}\ s^{-1}$.	751118
26.160	**Tetrathionate ion**							
	$^{\bullet}CO_2^- + S_4O_6^{2-} \rightarrow CO_2 + S_4O_6^{3-}$	5.8×10^7		0.1		p.r.	P.b.k. at 370 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate, as well as d.k. at 280 nm.	731027
26.161	**Peroxodisulfate ion**							
	$^{\bullet}CO_2^- + S_2O_8^{2-} \rightarrow CO_2 + SO_4^{2-} + SO_4^{\bullet-}$	$\sim 1 \times 10^5$				p.r.	D.k. at 290 nm in soln. contg. 0.012 mol L^{-1} N_2O, 5×10^{-3} mol L^{-1} CO and 0.01-0.05 mol L^{-1} $S_2O_8^{2-}$.	89A510
26.162	**Scandium(III)**							
	$^{\bullet}CO_2^- + Sc(III) \rightarrow$		1.4			p.r.	No reaction obs. in soln. contg. 1 mol L^{-1} formic acid and 0.01 mol L^{-1} Sc(III).	731057
26.163	**Titanium(III) ions**							
	$^{\bullet}CO_2^- + Ti^{3+} + H^+ \rightarrow Ti^{3+}CO_2H$	4×10^6	0.5			p.r.	P.b.k. in soln. contg. 0.3 mol L^{-1} sulfuric and 2 mol L^{-1} formic acid; competition with radical combination; complex formn. deduced from transient spectra.	79A341
		$\sim 5 \times 10^6$	1.4			p.r.	D.k. in soln. contg. 1 mol L^{-1} formic acid.	731057
26.164	**Thallium(I) ion**							
	$^{\bullet}CO_2^- + Tl^+ \rightarrow CO_2 + Tl^0$	3.0×10^6	3.7	0.05		p.r.	P.b.k. at 420 nm in soln. contg. 0.01-0.04 mol L^{-1} Tl^+, formate ion and CO_2; reaction goes to equilibrium.	89C001
		2.3×10^6	13			p.r.	P.b.k. at 420 nm in soln. contg. 1 mol L^{-1} formate and 1.5×10^{-2} mol L^{-1} Tl^+; reaction also obs. for neutral and acid soln.	80A123
26.165	**Uranium(VI)**							
	$^{\bullet}CO_2^- + U(VI) \rightarrow$	7.3×10^8				p.r.	Abs. changes in soln. contg. 0.4 mol L^{-1} H_2SO_4 + 5.3 mol L^{-1} HCO_2H.	94Z077
26.166	**12-Tungstate ion(6-), dihydrogen**							
	$^{\bullet}CO_2^- + H_2W_{12}O_{40}^{6-} \rightarrow CO_2 + H_2W_{12}O_{40}^{7-}$	1.2×10^8 $\sim 1 \times 10^7$	~1 ~5			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. ~0.5 mol L^{-1} formate, $HClO_4$ at pH 1 and ~0.01 mol L^{-1} phosphate buffer at pH 5-6.	83A368
26.167	**12-Tungstoferrate ion(5-)**							
	$^{\bullet}CO_2^- + FeW_{12}O_{40}^{5-} \rightarrow CO_2 + FeW_{12}O_{40}^{6-}$	4.1×10^8 1.7×10^8	~1 ~5			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. ~0.5 mol L^{-1} formate, $HClO_4$ at pH 1 and ~0.01 mol L^{-1} phosphate buffer at pH 5-6.	83A368

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.168	**12-Tungstophosphate ion(3-)**							
	$^{\bullet}CO_2^- + PW_{12}O_{40}^{3-} \rightarrow CO_2 + PW_{12}O_{40}^{4-}$	3.0×10^9	~1			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. ~0.5 mol L^{-1} formate and $HClO_4$; heteropoly compound unstable at pH >1.2.	83A368
26.169	**12-Tungstosilicate ion(4-)**							
	$^{\bullet}CO_2^- + SiW_{12}O_{40}^{4-} \rightarrow CO_2 + SiW_{12}O_{40}^{5-}$	6.4×10^8 8.4×10^8	~1 ~5			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. ~0.5 mol L^{-1} formate, $HClO_4$ at pH 1 and ~0.01 mol L^{-1} phosphate buffer at pH 5-6.	83A368
26.170	**Ytterbium(III)**							
	$^{\bullet}CO_2^- + Yb(III) \rightarrow$		1.4			p.r.	No reaction obs. in soln. contg. 1 mol L^{-1} formic acid and 0.01 mol L^{-1} Yb(III).	731057
26.171	**Zinc(I) ion**							
	$^{\bullet}CO_2^- + Zn^+ \rightarrow HCO_2^- + Zn^{2+}$	$\sim 4 \times 10^9$			295	p.r.	Estd. from first-order decay at 310 nm (Zn^+) in soln. contg. formate and $ZnSO_4$.	771011
26.172	**Zinc(II) ion**							
	$^{\bullet}CO_2^- + Zn^{2+} \rightarrow$	$< 2 \times 10^4$			295	p.r.	No reaction obs. in soln. contg. 0.5 mol L^{-1} $ZnSO_4$.	771011
		$< 10^2$				p.r.	Estd. from lack of increase in Zn^+ in soln. contg. 0.1 mol L^{-1} Zn^{2+} upon addn. of 0.1 mol L^{-1} formate ion, as well as γ-r. experiments [730039].	751027
26.173	**Acetophenone**							
	$^{\bullet}CO_2^- + C_6H_5COCH_3 \rightarrow CO_2 + C_6H_5\dot{C}O^-CH_3$	1×10^7	12			p.r.	P.b.k. at 440 nm.	680308
26.174	**Acridine**							
	$^{\bullet}CO_2^- + Ac + H^+ \rightarrow CO_2 + {}^{\bullet}AcH$	$\sim 3 \times 10^8$	7			p.r.	P.b.k.; at pH 13 adduct is formed.	79A305
26.175	**Acrylamide**							
	$^{\bullet}CO_2^- + H_2C{=}CHCONH_2 \rightarrow$ addn.	$\sim 4 \times 10^7$	~5			p.r.	Abs. changes; electron transfer not obs.	700052
26.176	**Adenosine 5'-monophosphate**							
	$^{\bullet}CO_2^- + AMP \rightarrow$	$< 10^6$	8.3			p.r.	P.b.k. at 550 nm in N_2O-satd. 0.1 mol L^{-1} formate.	680441
26.177	**Adriamycin, conjugate acid**							
	$^{\bullet}CO_2^- + {}^{+}HAdH_2 \rightarrow CO_2 + {}^{+}HAdH_2^{\bullet -}$	3.4×10^9	1.1, 6.5			p.r.	P.b.k. at 380, 475, and 720 nm in N_2O-satd. soln. contg. formate and $(1\text{-}9) \times 10^{-5}$ mol L^{-1} adriamycin.	85A360
26.178	**Adriamycin, negative ion**							
	$^{\bullet}CO_2^- + AdH^- \rightarrow CO_2 + AdH_2^{\bullet -} + OH^-$	1.8×10^8	11.5			p.r.	P.b.k. at 380, 475, and 720 nm in N_2O-satd. soln. contg. formate and $(1\text{-}9) \times 10^{-5}$ mol L^{-1} adriamycin.	85A360
26.179	**Alloxan**							
	$^{\bullet}CO_2^- + Al + H^+ \rightarrow CO_2 + {}^{\bullet}AlH$	3.7×10^7	4.8	0.1		p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; cor. for decay of $^{\bullet}CO_2^-$.	80A197
26.180	**3-Amino-1,2,4-benzotriazine-1,4-dioxide**							
	$^{\bullet}CO_2^- + C_7H_6N_4O_2 \rightarrow$ redn.	2.8×10^9	7.4	0.2		p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	88R247
26.181	**1-Amino-4-hydroxy-9,10-anthraquinone, conjugate base**							
	$^{\bullet}CO_2^- + 1,4\text{-}AQ(NH_2)(O^-) + H^+ \rightarrow CO_2 + [1,4\text{-}AQ(NH_2)(OH)]^{\bullet -}$	1.1×10^9 1.3×10^9	11 14			p.r.	P.b.k. at 650 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	92A416

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.182	**9,10-Anthraquinone-1,5-disulfonate ion**							
	$^{\bullet}CO_2^- + 1,5\text{-}diSO_3AQ^{2-} \rightarrow CO_2 + [1,5\text{-}diSO_3AQ]^{\bullet 3-}$	1.0×10^9	8.4			p.r.	P.b.k. at 500 or 385 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} anthraquinonedisulfonate.	91A047
26.183	**9,10-Anthraquinone-2,6-disulfonate ion**							
	$^{\bullet}CO_2^- + 2,6\text{-}diSO_3AQ^{2-} \rightarrow CO_2 + [2,6\text{-}diSO_3AQ]^{\bullet 3-}$	8.1×10^8	7.0			p.r.	P.b.k. at 515 or 390 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and $(2\text{-}10) \times 10^{-5}$ mol L^{-1} anthraquinonedisulfonate.	91A047
		2.4×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	73110
26.184	**9,10-Anthraquinone-1-sulfonate ion**							
	$^{\bullet}CO_2^- + 1\text{-}SO_3AQ^- \rightarrow CO_2 + [1\text{-}SO_3AQ]^{\bullet 2-}$	2.1×10^9				f.p./rq	P.b.k. at 500 nm in air-free soln. contg. 2 mol L^{-1} formate and 2×10^{-4} mol L^{-1} anthraquinone-1-sulfonate; radical from reductive quenching of triplet by formate.	93A410
		1.0×10^9 3.3×10^9	3 7			p.r.	P.b.k.	720391
26.185	**9,10-Anthraquinone-2-sulfonate ion**							
	$^{\bullet}CO_2^- + 2\text{-}SO_3AQ^- \rightarrow CO_2 + [2\text{-}SO_3AQ]^{\bullet 2-}$	2.1×10^9	~8			f.p./rq	P.b.k. at 500 nm in N_2-satd. soln. contg. 0.8 mol L^{-1} formate ion and 2×10^{-4} mol L^{-1} anthraquinone-2-sulfonate; radical from reductive quenching of triplet by formate.	91A174
		1.6×10^9	7			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. formate.	731104
		2.8×10^9 3.1×10^9	3 7			p.r.	P.b.k. in soln. contg. formate.	720391
26.186	**Azobis(*N,N*-dimethylformamide)**							
	$^{\bullet}CO_2^- + (CH_3)_2NCON{=}NCON(CH_3)_2 \rightarrow CO_2 + [(CH_3)_2NCONNCON(CH_3)_2]^{\bullet -}$	$\sim 2.5 \times 10^9$				p.r.	P.b.k. at 400 nm.	751194
26.187	**1,4-Benzenedithiol, conjugate base**							
	$^{\bullet}CO_2^- + 4\text{-}HSC_6H_4S^- \rightarrow HCO_2^- + 4\text{-}^-SC_6H_4S^{\bullet}$	1.5×10^9	~7	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; $k < 10^8$ L mol^{-1} s^{-1} for benzenedithiol dianion.	93A206
26.188	**1,4-Benzenedithiol**							
	$^{\bullet}CO_2^- + 4\text{-}HSC_6H_4SH \rightarrow HCO_2^- + 4\text{-}HSC_6H_4S^{\bullet}$	3.1×10^9	acid	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; $pK_a = 6.0, 7.7$.	93A206
26.189	**1,4-Benzoquinone**							
	$^{\bullet}CO_2^- + Q \rightarrow CO_2 + Q^{\bullet -}$	7×10^9	6.9	0.1		p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	730049
		6.6×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. formate.	731104
		6.6×10^9	~7	0.2		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	710619
26.190	**Bilirubin dianion**							
	$^{\bullet}CO_2^- + BR^{2-} \rightarrow CO_2 + BR^{\bullet 3-}$		11			p.r.	P.b.k. at 520 nm in N_2O-satd. micellar soln. contg. 0.05 mol L^{-1} formate and 2.5×10^{-4} mol L^{-1} CTAB gave $k = 5.3 \times 10^9$ L mol^{-1} s^{-1}; *k decreases with increasing [CTAB].* No reaction obs. in homogeneous solution	94N154

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.191	**2,2'-Bipyridine, conjugate acid**							
	$^{\bullet}CO_2^- + bpyH^+ \rightarrow CO_2 + bpyH^{\bullet}$	5.0×10^8	4.4	0.2		p.r.	P.b.k. at 375 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	79A148
26.192	**2,2'-Bipyridine**							
	$^{\bullet}CO_2^- + bpy \rightarrow$	$<10^6$	7			p.r.	P.b.k.	79A148
26.193	**1,1'-Bis(carboxyethyl)-4,4'-bipyridinium**							
	$^{\bullet}CO_2^- + CEV^{2+} \rightarrow CO_2 + CEV^{\bullet+}$	2.0×10^9	7.0	0.2		p.r.	P.b.k. at 680 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	761169
26.194	**1,1'-Bis(4-cyanophenyl)-4,4'-bipyridinium**							
	$^{\bullet}CO_2^- + CV^{2+} \rightarrow CO_2 + CV^{\bullet+}$	1.4×10^{10}	6.8	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	78A321
26.195	**1,1'-Bis(2-hydroxyethyl)-4,4'-bipyridinium**							
	$^{\bullet}CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\bullet+}$	1.9×10^{10}	6.8	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	78A321
26.196	**Bis(2-hydroxyethyl)trisulfide**							
	$^{\bullet}CO_2^- + (HOCH_2CH_2)_2S_3 \rightarrow CO_2 + HOCH_2CH_2SS^{\bullet} + HOCH_2CH_2S^-$	5×10^8	5.7			p.r.	P.b.k. at 370 nm in N_2O-satd. soln. contg. formate.	82A307
26.197	**3,3'-Bis(penicillamine)trisulfide**							
	$^{\bullet}CO_2^- + PenSSSPen \rightarrow CO_2 + PenS^- + PenSS^{\bullet}$	2.3×10^8	5.6	0.1		p.r.	P.b.k. at 374 nm in N_2-satd. soln. contg. 0.1 mol L^{-1} formate.	92A019
26.198	**5-Bromouracil**							
	$^{\bullet}CO_2^- + 5\text{-BrU} \rightarrow CO_2 + 5\text{-BrU}^{\bullet-}$	$>1.0 \times 10^8$				p.r.	P.b.k. at 440 nm ($BrUCO_2^-$) in N_2O-satd. soln. contg. formate.	690826
26.199	**1,4-Butanediylbis(1'-methyl-4,4'-bipyridinium)**							
	$^{\bullet}CO_2^- + BTQ^{4+} \rightarrow CO_2 + BTQ^{\bullet 3+}$	1.5×10^{10}	7.3	0.1	298	p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion and $(5\text{-}10) \times 10^{-5}$ mol L^{-1} viologen.	86A266
26.200	**2-*tert*-Butyl-1,4-benzoquinone**							
	$^{\bullet}CO_2^- + (CH_3)_3CQ \rightarrow CO_2 + (CH_3)_3CQ^{\bullet-}$	2.2×10^9	6.8		295	p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and $(1\text{-}8) \times 10^{-5}$ mol L^{-1} quinone.	95A022
26.201	**Camphor**							
	$^{\bullet}CO_2^- + C_{10}H_{16}O \rightarrow$	$\leq 10^6$	13			p.r.	D.k. of $^{\bullet}CO_2^-$ at 260 nm. in N_2O-satd. soln. contg. formate was unaffected by 10^{-3} mol L^{-1} camphor.	79A191
26.202	**Carbon tetrachloride**							
	$^{\bullet}CO_2^- + CCl_4 \rightarrow$					p.r.	Condy. study. No reaction obs.	710778
26.203	**4-Carboxybenzophenone, conjugate base**							
	$^{\bullet}CO_2^- + C_6H_5COC_6H_4\text{-}4\text{-}CO_2^- \rightarrow CO_2 + C_6H_5\dot{C}O^-C_6H_4\text{-}4\text{-}CO_2^-$	3.6×10^7	11.2			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A174
		3.2×10^7	11.2			f.p./rq	P.b.k. at 680 nm in N_2-satd. soln. contg. 0.8 mol L^{-1} formate ion and 4×10^{-3} mol L^{-1} benzophenone-4-carboxylate; radical from *reductive quenching of triplet by formate.*	91A174
26.204	**2-Carboxy-1-methylpyridinium**							
	$^{\bullet}CO_2^- + 2\text{-py}^+(CH_3)CO_2^- \rightarrow CO_2 + 2\text{-py}^{\bullet}(CH_3)CO_2^-$	7×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	82A146

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
26.205	**1-Chloro-4-nitrobenzene**							
	$^{\bullet}CO_2^- + 4\text{-}ClC_6H_4NO_2 \rightarrow CO_2 + [4\text{-}ClC_6H_4NO_2]^{\bullet -}$	3×10^8				p.r.	P.b.k.	77R167
26.206	**Crystal Violet cation**							
	$^{\bullet}CO_2^- + CV^+ \rightarrow CO_2 + C_{25}H_{30}N_3^+$	1.6×10^9	7			p.r.	D.k. at 520 nm as well as p.b.k. at ~400 nm.	731078
26.207	**Cystamine**							
	$^{\bullet}CO_2^- + [H_2NCH_2CH_2S]_2 \rightarrow CO_2 + [H_2NCH_2CH_2S]_2^{\bullet -}$	$\leq 2.5 \times 10^7$	9.6	0.1		p.r.	P.b.k. at 410 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion, up to 3×10^{-3} mol L^{-1} cystamine and 4×10^{-4} mol L^{-1} cysteamine.	84A233
26.208	**Daunomycin**							
	$^{\bullet}CO_2^- + D \rightarrow CO_2 + D^{\bullet -}$	2.0×10^9	7	0.1		p.r.	P.b.k. at ≥600 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	85A001
26.209	***5-Deazalumiflavin, protonated***							
	$^{\bullet}CO_2^- + 5\text{-DeLFH}^+ \rightarrow CO_2 + 5\text{-DeLFH}^{\bullet}$	2.5×10^9	0			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} formic acid; pK_a = 1.7, 11.3.	89A097
26.210	**5-Deazalumiflavin**							
	$^{\bullet}CO_2^- + 5\text{-DeLF} \rightarrow CO_2 + 5\text{-DeLF}^{\bullet -}$	5.0×10^8	7	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	89A097
26.211	**5-Deazalumiflavin anion**							
	$^{\bullet}CO_2^- + 5\text{-DeLF(-H)}^- \rightarrow CO_2 + 5\text{-DeLF(-H)}^{\bullet 2-}$	2.5×10^8	13			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	89A097
26.212	**3,6-Diamino-10-methylacridinium**							
	$^{\bullet}CO_2^- + ACFl^+ \rightarrow CO_2 + [ACFl]^{\bullet}$	3.7×10^8				p.r.	D.k. (dye) in Ar-satd. 0.1 mol L^{-1} formate.	700241
26.213	**1,1'-Dibenzyl-4,4'-bipyridinium**							
	$^{\bullet}CO_2^- + BV^{2+} \rightarrow CO_2 + BV^{\bullet +}$	1.7×10^{10}	6.8	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	78A321
		6.7×10^9	7.0	0.2		p.r.	P.b.k. at 680 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	761169
26.214	**3,5-Dibromo-4-nitrosobenzenesulfonate ion**							
	$^{\bullet}CO_2^- + DBNBS \rightarrow$	1.5×10^9	~8.3			p.r.	D.k. at 370 nm in N_2O-satd. soln. contg. formate.	92A304
		2.5×10^9				p.r.		90A024
26.215	**2,6-Dichloroindophenolate ion**							
	$^{\bullet}CO_2^- + DCIP^- \rightarrow CO_2 + DCIP^{\bullet 2-}$	3.5×10^9	7			p.r.	D.k. at 600 nm in N_2O-satd. soln. contg. formate, as well as p.b.k. at ~400 nm; 100% e-transfer.	731078
26.216	***N,N'*-Diethylthiourea**							
	$^{\bullet}CO_2H + C_2H_5NHCSNHC_2H_5 \rightarrow$	5.5×10^8	<0			p.r.	P.b.k. at 425 nm in soln. contg. 3.6 mol L^{-1} H_2SO_4 and 1 mol L^{-1} formate. Mechanism suggested to be protonation at S and H abstr. from NH.	94A284
26.217	**Dihydrolipoamide**							
	$^{\bullet}CO_2^- + L(SH)_2 \rightarrow HCO_2^- + L\dot{S}_2H$	6.4×10^8	4			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate ion and (1-15) $\times 10^{-4}$ mol L^{-1} dihydrolipoamide; $k_r = 1.2 \times 10^7$ L mol^{-1} s^{-1}.	89C009

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.218	**1,5-Dihydroxy-9,10-anthraquinone dianion**							
	$^{\bullet}CO_2^- + 1,5\text{-}AQ(O^-)_2 + 2\ H^+ \rightarrow CO_2 + [1,5\text{-}AQ(OH)_2]^{\bullet -}$	2.7×10^8	~14			p.r.	P.b.k. at 640 nm in N_2O-satd. soln. contg. (5-10) $\times 10^{-5}$ mol L^{-1} quinone and 0.1 mol L^{-1} formate ion. $pK_a = 10.6, 12.5$.	91A124
26.219	**1,5-Dihydroxy-9,10-anthraquinone monoanion**							
	$^{\bullet}CO_2^- + 1,5\text{-}AQ(OH)(O^-) + H^+ \rightarrow CO_2 + [1,5\text{-}AQ(OH)_2]^{\bullet -}$	1.0×10^9	11			p.r.	P.b.k. at 640 nm in N_2O-satd. soln. contg. (5-10) $\times 10^{-5}$ mol L^{-1} quinone and 0.1 mol L^{-1} formate ion; $pK_a = 10.6, 12.5$.	91A124
26.220	**1,8-Dihydroxy-9,10-anthraquinone dianion**							
	$^{\bullet}CO_2^- + 1,8\text{-}AQ(O^-)_2 + 2\ H^+ \rightarrow CO_2 + [1,8\text{-}AQ(OH)_2]^{\bullet -}$	3.7×10^8	~14			p.r.	P.b.k. at 640 nm in N_2O-satd. soln. contg. (5-10) $\times 10^{-5}$ mol L^{-1} quinone and 0.1 mol L^{-1} formate ion; $pK_a = 9.7, 12.1$.	91A124
26.221	**1,8-Dihydroxy-9,10-anthraquinone monoanion**							
	$^{\bullet}CO_2^- + 1,8\text{-}AQ(OH)(O^-) + H^+ \rightarrow CO_2 + [1,8\text{-}AQ(OH)_2]^{\bullet -}$	1.7×10^9	11			p.r.	P.b.k. at 640 nm in N_2O-satd. soln. contg. (5-10) $\times 10^{-5}$ mol L^{-1} quinone and 0.1 mol L^{-1} formate ion; $pK_a = 9.7, 12.1$.	91A124
26.222	**2,6-Dihydroxy-9,10-anthraquinone dianion**							
	$^{\bullet}CO_2^- + 2,6\text{-}AQ(O^-)_2 + H^+ \rightarrow CO_2 + [2,6\text{-}AQ(OH)(O^-)]^{\bullet -}$	1.0×10^9	11			p.r.	P.b.k. at >600 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (5-40) $\times 10^5$ mol L^{-1} 2,6-dihydroxyanthraquinone.	94A089
26.223	**1,4-Dihydroxy-9,10-anthraquinone-2-sulfonate ion**							
	$^{\bullet}CO_2^- + 1,4\text{-}AQS(OH)_2^- \rightarrow CO_2 + [1,4\text{-}AQS(OH)_2]^{\bullet 2-}$	3.2×10^9	5.7			p.r.	P.b.k. at 475 nm in N_2O-satd. soln. contg. (2-6) $\times 10^{-5}$ mol L^{-1} quinone and 0.1 mol L^{-1} formate and 2×10^{-3} mol L^{-1} phosphate buffer (or 1 mol L^{-1} formic acid and 0.05 mol L^{-1} H_2SO_4); $pK_a = 9.1, 11.85$; k for reaction of 6-sulfonate similar.	88A304
26.224	**(*E*)-4,5-Dihydroxy-1,2-dithiane**							
	$^{\bullet}CO_2^- + \overline{[SSCH_2(CHOH)_2CH_2]} \rightarrow CO_2 + \overline{[\dot{S}^-SCH_2(CHOH)_2CH_2]}$	5.2×10^7 9.6×10^7 1.5×10^8	6.6		273 298 333	p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. (1-10) $\times 10^{-4}$ mol L^{-1} DTT-ox and 0.1-0.5 mol L^{-1} formate ion; curved Arrhenius plot; mechanism suggested to be addn. followed by decomp. to radical anion.	89A167
		1.1×10^8	9	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	82A171
26.225	**5,8-Dihydroxy-1,4-naphthoquinone**							
	$^{\bullet}CO_2^- + 5,8\text{-}NQ(OH)_2 \rightarrow CO_2 + [5,8\text{-}NQ(OH)_2]^{\bullet -}$	5.1×10^9	5.8	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	83A039
26.226	**5,8-Dihydroxy-1,4-naphthoquinone, conjugate base**							
	$^{\bullet}CO_2^- + 5,8\text{-}NQ(OH)(O^-) + H_2O \rightarrow CO_2 + OH^- + [5,8\text{-}NQ(OH)_2]^{\bullet -}$	2.2×10^9	9.2	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	83A039
	$^{\bullet}CO_2^- + 5,8\text{-}NQ(O^-)_2 + 2\ H_2O \rightarrow CO_2 + 2\ OH^- + [5,8\text{-}NQ(OH)_2]^{\bullet -}$	1.4×10^9	13.0	0.2		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	83A039
26.227	**1,1'-Dimethyl-4,4'-bipyridinium**							
	$^{\bullet}CO_2^- + MV^{2+} \rightarrow CO_2 + MV^{\bullet +}$	2.9×10^9 6.5×10^9	1	1.8 0.1		p.r.	G.V. Buxton, private communication	90C004
		6.4×10^9	11	1.0	~295	f.p./rq	Calcd. from decay at 490 nm, recovery at 440 nm, and formation at 605 nm in soln. contg. 0.1 mol L^{-1} oxalate ion and 5×10^{-4} mol L^{-1} methyl viologen; $^{\bullet}CO_2^-$ from reductive quenching of $*[Ru(bpz)_3^{2+}]$ by $C_2O_4^{2-}$.	89E105

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.227	**1,1'-Dimethyl-4,4'-bipyridinium** — Continued							
		$\sim 1 \times 10^{10}$		→0		p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. 0.1-1.5 mol L^{-1} formate ion ($k = 4 \times 10^9$ L $mol^{-1}\ s^{-1}$ at the latter concn.).	86A327
		1.5×10^{10}		0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	731074
26.228	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$^{\bullet}CO_2^- + MV^{\bullet+} \rightarrow$	$\sim 1 \times 10^9$		0.1		γ-r.	Estd. from effect of dose on absorbance in N_2O-satd. soln contg. 0.1 mol L^{-1} formate.	86A327
26.229	**Dimethyl fumarate**							
	$^{\bullet}CO_2^-$ + *trans*-$CH_3O_2CCH{=}CHCO_2CH_3 \rightarrow CO_2 + [CH_3O_2CCHCHCO_2CH_3]^{\bullet-}$	9×10^8	7.0			p.r.	P.b.k.; >80% e-transfer.	730097
26.230	**1,3-Dimethyllumichrome**							
	$^{\bullet}CO_2^- + Fl \rightarrow CO_2 + FlH^{\bullet}$	6.3×10^8	6, 10	0.1		p.r.	P.b.k. at ~450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	82B104
26.231	***N,N*-Dimethyl-4-nitrosoaniline**							
	$^{\bullet}CO_2^- + 4\text{-}Me_2NC_6H_4NO \rightarrow CO_2 + [4\text{-}Me_2NC_6H_4NO]^{\bullet-}$	1.8×10^9	7	0.25		p.r.	D.k. at 440 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} formate.	690156
		1.9×10^9				p.r.	D.k. at 440 nm in N_2O-satd. soln. contg. formate ion.	680066
26.232	**5,5-Dimethyl-1-pyrroline-1-oxyl**							
	$^{\bullet}CO_2^- + DMPO \rightarrow DMPO\text{-}CO_2^-$	7.5×10^8	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	84A426
26.233	**4,4'-Dimethyl-1,1'-trimethylene-2,2'-bipyridinium**							
	$^{\bullet}CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\bullet+}$	5.8×10^9	7.0			p.r.	P.b.k. at ~380 nm in O_2-free soln.	84A292
26.234	**1,4-Dinitrobenzene**							
	$^{\bullet}CO_2^- + 1,4\text{-}C_6H_4(NO_2)_2 \rightarrow CO_2 + [1,4\text{-}C_6H_4(NO_2)_2]^{\bullet-}$	2.1×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.235	**2,4-Dinitrobenzoate ion**							
	$^{\bullet}CO_2^- + 2,4\text{-}(NO_2)_2C_6H_3CO_2^- \rightarrow CO_2 + [2,4\text{-}(NO_2)_2C_6H_3CO_2]^{\bullet 2-}$	1.8×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	761111
26.236	**2,5-Dinitrobenzoate ion**							
	$^{\bullet}CO_2^- + 2,5\text{-}(NO_2)_2C_6H_3CO_2^- \rightarrow CO_2 + [2,5\text{-}(NO_2)_2C_6H_3CO_2]^{\bullet 2-}$	1.9×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	761111
26.237	**3,4-Dinitrobenzoate ion**							
	$^{\bullet}CO_2^- + 3,4\text{-}(NO_2)_2C_6H_3CO_2^- \rightarrow CO_2 + [3,4\text{-}(NO_2)_2C_6H_3CO_2]^{\bullet 2-}$	1.8×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	761111
26.238	**3,5-Dinitrobenzoate ion**							
	$^{\bullet}CO_2^- + 3,5\text{-}(NO_2)_2C_6H_3CO_2^- \rightarrow CO_2 + [3,5\text{-}(NO_2)_2C_6H_3CO_2]^{\bullet 2-}$	2.5×10^9	7			p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	761111
26.239	**1-(2,4-Dinitrophenyl)pyridinium**							
	$^{\bullet}CO_2^- + 2,4\text{-}(NO_2)_2C_6H_3py^+ \rightarrow CO_2 + [2,4\text{-}(NO_2)_2C_6H_3py]^{\bullet}$	4×10^8				p.r.	P.b.k.	77R167
26.240	**1,1'-Diphenyl-4,4'-bipyridinium**							
	$^{\bullet}CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\bullet+}$	1.3×10^{10}	6.8	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	78A321

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
26.241	**1,2-Dithiolane-3-pentanoate ion**							
	$^{\bullet}CO_2^- + RSSR \rightarrow CO_2 + RSSR^{\bullet -}$	5.6×10^8	6.1-9.2			p.r.	P.b.k. at 410 nm; $k = 9 \times 10^8$ L mol^{-1} s^{-1} at pH 3.5.	751195
		5.5×10^8	7	0.1		p.r.	P.b.k. at 410 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	700560
26.242	**Dithiothreitol**							
	$^{\bullet}CO_2^- + HSCH_2(CHOH)_2CH_2SH \rightarrow HCO_2^- + HSCH_2(CHOH)_2CH_2S^{\bullet}$	8.3×10^8	8.1		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N_2O-satd. soln. contg. DTT; pK_a = 8.3, 9.5.	87G007
26.243	**Eosin dianion**							
	$^{\bullet}CO_2^- + Eos \rightarrow CO_2 + (Eos)^{\bullet -}$	2.5×10^8	8.5-9.0			p.r.	P.b.k. at 405 nm in soln. contg. 0.01 mol L^{-1} HCO_2^- and 0.001 mol L^{-1} H_2O_2; product is semiquinone.	670038
26.244	**1-Ethoxy-2-methylpyridinium**							
	$^{\bullet}CO_2^- + C_2H_5Opy^+CH_3 \rightarrow CO_2 + C_2H_5\dot{O}pyCH_3$	2.1×10^8				p.r.	D.k. at 280 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} formate and 1.12×10^{-3} mol L^{-1} 1-ethoxy-2-methylinium tetrafluoroborate.	88A255
26.245	**1,1'-Ethylene-2,2'-bipyridinium**							
	$^{\bullet}CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\bullet +}$	1.2×10^{10}	7.0	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion and 2×10^{-3} mol L^{-1} phosphate buffer.	84A292
		1.2×10^{10}	6.8	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	78A321
		4.0×10^9	7.0	0.2		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate ion.	761169
26.246	**1,1'-Ethylene-4,4'-dimethyl-2,2'-bipyridinium**							
	$^{\bullet}CO_2^- + MDQ^{2+} \rightarrow CO_2 + MDQ^{\bullet +}$	1.1×10^{10}	7.0			p.r.	P.b.k. at ~380 nm in O_2-free soln.	84A292
26.247	***N*-Ethylmaleimide**							
	$^{\bullet}CO_2^- + NEM \rightarrow CO_2 + NEM^{\bullet -}$	5.4×10^9	6-7			p.r.	P.b.k. in N_2O-satd. soln. contg. formate; 100% e-transfer based on abs. spectra.	720144
26.248	**1-(2-Ethylsulfonyl)ethyl-2-methyl-5-nitroimidazole (Tinidazole)**							
	$^{\bullet}CO_2^- + (ImH)\text{-}NO_2 \rightarrow CO_2 + (ImH)\text{-}NO_2^{\bullet -}$	1.6×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
26.249	**1-(2-Ethylsulfonyl)ethyl-2-methyl-5-nitroimidazole, conjugate acid**							
	$^{\bullet}CO_2^- + (ImH_2^+)\text{-}NO_2 \rightarrow CO_2 + (ImH_2^+)\text{-}N\dot{O}_2H$	1.7×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} formic acid and 0.001 mol L^{-1} nitroimidazole; pK_a = 1.85.	90A467
26.250	**Flavine adenine dinucleotide**							
	$^{\bullet}CO_2^- + FAD \rightarrow CO_2 + FAD^{\bullet -}$	7×10^8	10	0.06		p.r.	P.b.k. at 370 nm in N_2O-satd. soln. contg. formate ion.	84A045
		1.2×10^9	7			p.r.	Unpublished data.	82G120
26.251	**Flavine mononucleotide**							
	$^{\bullet}CO_2^- + FMN \rightarrow CO_2 + FMN^{\bullet -}$	3.0×10^9 1.0×10^{10}	6.0 11.0	0.1		p.r.	P.b.k. at 525 and 560 nm in N_2O-satd. soln. cont. 0.1 mol L^{-1} formate.	83A091
26.252	**Fluorescein dianion**							
	$^{\bullet}CO_2^- + Fl^{2-} \rightarrow$	2.6×10^7	10.4			p.r.	P.b.k. in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} formate; product is semiquinone.	680172
26.253	***N*-Formylkynurenine**							
	$^{\bullet}CO_2^- + FK + H^+ \rightarrow CO_2 + FKH^{\bullet}$	$>3 \times 10^7$	7.6	0.1		p.r.	P.b.k. (semiquinone) in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	757361

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.254	**Furadantin**							
	$^{\bullet}CO_2^- + NF \rightarrow CO_2 + NF^{\bullet -}$	1.0×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} of the nitrofuran.	90A467
26.255	**(*E*)-2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide**							
	$^{\bullet}CO_2^- + NF \rightarrow CO_2 + NF^{\bullet -}$	2.0×10^9	7.4			p.r.	P.b.k. at 680 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} formate ion and 0.002 mol L^{-1} sodium phosphate.	84A208
26.256	**(*Z*)-2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide**							
	$^{\bullet}CO_2^- + NF \rightarrow CO_2 + NF^{\bullet -}$	3.0×10^9	7.4			p.r.	P.b.k. at 680 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} formate ion and 0.002 mol L^{-1} sodium phosphate.	84A208
26.257	**Glutathione**							
	$^{\bullet}CO_2^- + GSH \rightarrow$	3×10^8	7		293	p.r.	Abs. changes in N_2O-satd. soln. contg. phosphate buffer.	88A251
26.258	**Glutathione, oxidized**							
	$^{\bullet}CO_2^- + GSSG \rightarrow$	$\ll 10^7$				p.r.	No 420 nm abs. ($RSSR^{\bullet -}$) obs. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	720388
26.259	**Glycine anhydride**							
	$^{\bullet}CO_2^- + \text{-}CH_2CONHCH_2CONH\text{-} \rightarrow$	$<10^7$	6.2			p.r.	No *e*-transfer obs. in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	710554
26.260	***Hematoporphyrin IX***							
	$^{\bullet}CO_2^- + HP \rightarrow CO_2 + HP^{\bullet -}$	4×10^7	13.0			p.r.	P.b.k. at 600-650 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	741040
26.261	**Histidine**							
	$^{\bullet}CO_2^- + His \rightarrow$	$<2 \times 10^5$	7		293	p.r.	Abs. changes in N_2O-satd. soln. contg. phosphate buffer.	88A251
26.262	**Hydrogen fumarate ion**							
	$^{\bullet}CO_2^- + trans\text{-}HO_2CCH{=}CHCO_2^- \rightarrow$	2.0×10^7	4.0			p.r.	P.b.k.; >30% *e*-transfer; no *e*-transfer at pH 10.0.	730097
26.263	**Hydrogen maleate ion**							
	$^{\bullet}CO_2^- + cis\text{-}HO_2CCH{=}CHCO_2^- \rightarrow$	1.1×10^8	5.2			p.r.	P.b.k.; ≥ 65% *e*-transfer; no *e*-transfer obs. at pH 10.5 (dianion).	730097
26.264	**2-Hydroxy-9,10-anthraquinone monoanion**							
	$^{\bullet}CO_2^- + 2\text{-}AQ(O^-) \rightarrow CO_2 + 2\text{-}AQ^{\bullet}(O^-)^-$	1.0×10^9	11			p.r.	P.b.k. at >600 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and (5-40) $\times 10^5$ mol L^{-1} 2-hydroxyanthraquinone.	94A089
26.265	**1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole (Metronidazole)**							
	$^{\bullet}CO_2^- + (ImH)\text{-}NO_2 \rightarrow CO_2 + (ImH)\text{-}NO_2^{\bullet -}$	1.2×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
		1.7×10^9	4			p.r.	P.b.k. in buffered N_2O-satd. soln. contg. 0.1 or 1 mol L^{-1} formate contg. 0.1-1 $\times 10^{-3}$ mol L^{-1} nitroimidazole; $pK_a = 2.5$.	87A208
		1.1×10^9	6					
		1.1×10^9	8					
		0.87×10^9	11.6					
		8×10^8				p.r.	D.k. at 320 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	741135
		8×10^8				p.r.	C.k. rel. to $k(^{\bullet}CO_2^- + TAN) = 6 \times 10^8$ L $mol^{-1}\ s^{-1}$.	741135

TABLE 26. Carbon dioxide radical anion — Continued

Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
26.266 1-(2-Hydroxyethyl)-2-methyl-5-nitroimidazole, conjugate acid							
$^{\bullet}CO_2^- + (ImH_2^+)\text{-}NO_2 \rightarrow CO_2 + (ImH_2^+)\text{-}NO_2H$	1.5×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} formic acid and 0.001 mol L^{-1} nitroimidazole; pK_a = 2.5.	90A467
26.267 1-(2-Hydroxy-3-methoxypropyl)-2-nitroimidazole (Misonidazole)							
$^{\bullet}CO_2^- + (ImH)\text{-}NO_2 \rightarrow CO_2 + (ImH)\text{-}NO_2^{\bullet -}$	1.6×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
26.268 1-(2-Hydroxy-3-methoxypropyl)-2-nitroimidazole, conjugate acid							
$^{\bullet}CO_2^- + (ImH_2^+)\text{-}NO_2 \rightarrow CO_2 + (ImH)\text{-}NO_2H$	1.0×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} formic acid and 0.001 mol L^{-1} nitroimidazole; pK_a = −0.75.	90A467
26.269 2-Hydroxy-1,4-naphthoquinone							
$^{\bullet}CO_2^- + 2\text{-(OH)NQ} \rightarrow CO_2 + 2\text{-(OH)NQ}^{\bullet -}$	2.0×10^9	7.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. formate.	731104
26.270 5-Hydroxy-1,4-naphthoquinone (Juglone)							
$^{\bullet}CO_2^- + 5\text{-OH-NQ} \rightarrow CO_2 + 5\text{-OH-NQ}^{\bullet -}$	4.4×10^9 3.8×10^9 1.3×10^9	1.2 6.4 10.5			p.r.	P.b.k. at 385 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate, (2-5.4) × 10^{-5} mol L^{-1} juglone (pK_a = 8.85) and 4×10^{-3} mol L^{-1} phosphate buffer.	87A234
26.271 6-Hydroxy-5-nitrothymine							
$^{\bullet}CO_2^- + TNO_2(OH) \rightarrow CO_2 + TNO_2(OH)^-$	1.7×10^8	2			p.r.	P.b.k. at 430 nm.	80A210
26.272 6-Hydroxy-5-nitrothymine, conjugate base							
$^{\bullet}CO_2^- + TNO_2(O^-) \rightarrow CO_2 + TNO_2(O^-)^-$	9×10^7	6.5			p.r.	D.k. at 340 nm.	80A210
26.273 Indigodisulfonate ion							
$^{\bullet}CO_2^- + IDS^{2-} \rightarrow CO_2 + IDS^{\bullet 3-}$	2.1×10^9	7.0			p.r.	P.b.k. at 400 nm, as well as d.k. at 610 nm in N_2O-satd. soln. contg. formate.	731078
26.274 Indophenolate ion							
$^{\bullet}CO_2^- + O{=}C_6H_4{=}NC_6H_4O^- \rightarrow CO_2 + [O{=}C_6H_4{=}NC_6H_4O]^{\bullet 2-}$	2.8×10^9	9.0			p.r.	P.b.k. at ~ 400 nm, as well as d.k. at 610 nm in N_2O-satd. soln. contg. formate.	731078
26.275 Lipoamide							
$^{\bullet}CO_2^- + LS_2 \rightarrow CO_2 + LS_2^{\bullet -}$	5.5×10^8	9	0.1		p.r.	P.b.k. at 400 nm in soln. contg. 0.1 mol L^{-1} formate and 0.25-1 × 10^{-3} mol L^{-1} lipoamide.	84A011
26.276 Lumichrome							
$^{\bullet}CO_2^- + Fl \rightarrow CO_2 + FlH^{\bullet}$	2.5×10^9 4.7×10^8	6 10	0.1		p.r.	P.b.k. at ~450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	82B104
	1.8×10^9	7			p.r.	Unpublished data.	82G120
26.277 Lumiflavine							
$^{\bullet}CO_2^- + LF \rightarrow CO_2 + LF^{\bullet -}$	3.0×10^9 2.1×10^9	9 11.2		296	p.r.	P.b.k.	85A389
	3.6×10^9	7		297	p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. formate ion.	83A073
26.278 Lumiflavine semiquinone							
$^{\bullet}CO_2^- + LFH^{\bullet} \rightarrow$	1.7×10^9	7		297	p.r.	Decay to LFH$^-$ and LF$_0$ from calcd. concn.-time profile.	83A073

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.279	**2-Mercaptobenzimidazole, conjugate acid**							
	$^{\bullet}CO_2H + MBZH^+ \rightarrow HCO_2H + [MBZ]^{\bullet+}$	7.7×10^9	<0			p.r.	P.b.k. at 610 nm in N_2-satd. soln. contg. 3.6 mol L^{-1} H_2SO_4, 5×10^{-4} mol L^{-1} 2-mercaptobenzimidazole and formic acid.	95A083
26.280	**5,10-Methenyltetrahydrofolate**							
	$^{\bullet}CO_2^- + CH^+H_4(folate) \rightarrow CO_2 + CH^+H_4(folate)^{\bullet-}$	2.4×10^9	1.5			p.r.	P.b.k. at 360 nm in soln. contg. 1 mol L^{-1} formate.	91A041
26.281	**Methoxatine**							
	$^{\bullet}CO_2^- + MTX \rightarrow CO_2 + [MTX]^{\bullet-}$	2.8×10^8	7.2		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	90A247
		3.3×10^8	7.3			p.r.	P.b.k. at 460 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate, 5×10^{-3} mol L^{-1} phosphate and $\sim 2 \times 10^{-4}$ mol L^{-1} methoxatine.	86A520
26.282	**3-Methyl-7,8-bis,nor-5-deazalumiflavin**							
	$^{\bullet}CO_2^- + dFl_{ox} \rightarrow d\dot{F}l\text{-}1\text{-}CO_2^-$	2.0×10^9	5.4-9.2	0.1		p.r.	P.b.k. at 560 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion; initial product suggested to be adduct.	81A434
26.283	**Methylene Blue cation**							
	$^{\bullet}CO_2^- + MB^+ \rightarrow CO_2 + {}^{\bullet}MB$	8.5×10^9	6.8			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	90A329
		$\sim 7 \times 10^8$ $\sim 1 \times 10^9$ $\sim 2 \times 10^9$ 5.6×10^9	−5.7 −0.8 1.8 ~9			p.r.	D.k. at 580 nm in soln. contg. 0.1 mol L^{-1} *formate.*	650396
26.284	**1-Methyllumichrome**							
	$^{\bullet}CO_2^- + Fl \rightarrow CO_2 + FlH^{\bullet}$	1.9×10^9 3.4×10^8	6 10	0.1		p.r.	P.b.k. at ~450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	82B104
26.285	**3-Methyllumichrome**							
	$^{\bullet}CO_2^- + Fl \rightarrow CO_2 + FlH^{\bullet}$	3.2×10^9 5.5×10^8	6 10	0.1		p.r.	P.b.k. at ~450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	82B104
26.286	***S*-Methylmethionine**							
	$^{\bullet}CO_2^- + Me_2S^+CH_2CH_2CH(NH_3^+)CO_2^- \rightarrow$	$<10^6$				p.r.	No reaction obs.; c.k. rel. to $k(CO_2^- + TNM) = 4 \times 10^9\ L\ mol^{-1}\ s^{-1}$.	91A184
26.287	**2-Methyl-1,4-naphthoquinone**							
	$^{\bullet}CO_2^- + 2\text{-}CH_3NQ \rightarrow CO_2 + [2\text{-}CH_3NQ]^{\bullet-}$	4.8×10^9	7			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. formate.	731047
		5.4×10^9	6.9			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. *formate; 100% e-transfer.*	723057
26.288	**1-Methylnicotinamide**							
	$^{\bullet}CO_2^- + 3\text{-}py^+(CH_3)CONH_2 \rightarrow CO_2 + 3\text{-}py^{\bullet}(CH_3)CONH_2$	4.6×10^9	8.5	0.1		p.r.	P.b.k. at 420 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	680441
26.289	**Methyl 4-nitrobenzenesulfonate**							
	$^{\bullet}CO_2^- + 4\text{-}O_2NC_6H_4SO_3CH_3 \rightarrow CO_2 + [4\text{-}NO_2C_6H_4SO_3CH_3]^{\bullet-}$	1.5×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.290	**Methyl 4-nitrobenzoate**							
	$^{\bullet}CO_2^- + 4\text{-}O_2NC_6H_4CO_2CH_3 \rightarrow CO_2 + [4\text{-}NO_2C_6H_4CO_2CH_3]^{\bullet-}$	1.2×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.291	**2-Methyl-5-nitroimidazole**							
	$^{\bullet}CO_2^- + (ImH)\text{-}NO_2 \rightarrow CO_2 + (ImH)\text{-}NO_2^{\bullet -}$	7.4×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
		5.8×10^8	4			p.r.	P.b.k. in buffered N_2O-satd. soln. contg. 0.1 or 1 mol L^{-1} formate and $(0.1\text{-}1) \times 10^{-3}$ mol L^{-1} nitroimidazole; $pK_a = 1.1, 9.7$.	87A208
		5.5×10^8	6					
		6.9×10^8	8					
26.292	**2-Methyl-5-nitroimidazole, conjugate acid**							
	$^{\bullet}CO_2^- + (ImH_2^+)\text{-}NO_2 \rightarrow CO_2 + (ImH_2^+)\text{-}N\dot{O}_2H$	1.9×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} formic acid and 0.001 mol L^{-1} nitroimidazole; $pK_a = 0.8, 9.7$.	90A467
26.293	**2-Methyl-5-nitroimidazole, conjugate base**							
	$^{\bullet}CO_2^- + (Im^-)\text{-}NO_2 \rightarrow CO_2 + (Im^-)\text{-}NO_2^{\bullet -}$	1.1×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
		1.4×10^8	11.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 or 1 mol L^{-1} formate and $(0.1\text{-}1) \times 10^{-3}$ mol L^{-1} nitroimidazole.	87A208
26.294	**2-Methyl-2-nitrosopropane**							
	$^{\bullet}CO_2^- + (CH_3)_3CNO \rightarrow$ addn.	1.7×10^9	9.2		~291	p.r.	P.b.k. (esr) in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.01 mol L^{-1} borate buffer.	91D097
26.295	***N*-Methyl-4-phenyl-2,3-dihydropyridinium**							
	$^{\bullet}CO_2^- + MPDP^+ \rightarrow CO_2 + MPDP^{\bullet}$	5.8×10^9	7.0			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} formate and 0.1 mol L^{-1} phosphate buffer.	89A012
26.296	***N*-Methyl-4-phenylpyridinium**							
	$^{\bullet}CO_2^- + MPP^+ \rightarrow CO_2 + MPP^{\bullet}$	3.4×10^8	7.9			p.r.	P.b.k. in Ar-satd. soln. contg. 0.1 mol L^{-1} formate.	87A355
26.297	**Mitomycin C**							
	$^{\bullet}CO_2^- + Aq \rightarrow CO_2 + Aq^{\bullet -}$	1.8×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and $(4\text{-}50) \times 10^{-5}$ mol L^{-1} mitomycin C.	88A260
26.298	**1-(2-*N*-Morpholinoethyl)-4-nitroimidazole (Nimorazole)**							
	$^{\bullet}CO_2^- + (ImH)\text{-}NO_2 \rightarrow CO_2 + (ImH)\text{-}NO_2^{\bullet -}$	1.9×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
26.299	**1-(2-*N*-Morpholinoethyl)-4-nitroimidazole, conjugate acid**							
	$^{\bullet}CO_2^- + (ImH_2^+)\text{-}NO_2 \rightarrow CO_2 + (ImH_2^+)\text{-}N\dot{O}_2H$	1.2×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} formic acid and 0.001 mol L^{-1} nitroimidazole; $pK_a = 0.85$.	90A467
26.300	**1,4-Naphthoquinone**							
	$^{\bullet}CO_2^- + NQ \rightarrow CO_2 + NQ^{\bullet -}$	3.2×10^9	~8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	91A174
		4.0×10^9	~8			f.p./rq	P.b.k. in N_2-satd. soln. contg. 0.02 mol L^{-1} formate ion and 3×10^{-4} mol L^{-1} naphthoquinone; radical from reductive quenching of triplet by formate.	91A174
26.301	**Nicotinamide adenine dinucleotide**							
	$^{\bullet}CO_2^- + NAD^+ \rightarrow CO_2 + NAD^{\bullet}$	1.6×10^9	6.4	0.1		p.r.	P.b.k. at 400 nm in N_2O satd. soln. contg. 0.1 mol L^{-1} formate.	680441
26.302	**Nifuroxime**							
	$^{\bullet}CO_2^- + NF \rightarrow CO_2 + NF^{\bullet -}$	2.0×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} of the nitrofuran.	90A467

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.302	**Nifuroxime** — Continued							
		2.7×10^9				p.r.	P.b.k. at 390 nm in CO_2-satd. soln. contg. *tert*-BuOH or 0.2 mol L^{-1} formate; 100% *e*-transfer.	731099
26.303	**Nifurtimox**							
	$^{\bullet}CO_2^- + NF \rightarrow CO_2 + NF^{\bullet -}$	2.7×10^9	7			p.r.	P.b.k. at 405 nm oxygen-free soln. contg. formate.	91A487
26.304	**Nitro Blue Tetrazolium**							
	$^{\bullet}CO_2^- + NBT^{2+} \rightarrow CO_2 + NBT^{\bullet +}$	6.4×10^9	10	0.1		p.r.	P.b.k. at 405 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	80A085
26.305	**4-Nitroacetophenone**							
	$^{\bullet}CO_2^- + PNAP \rightarrow CO_2 + [PNAP]^{\bullet -}$	1.8×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
		7×10^8				p.r.	P.b.k.	77R167
		1.0×10^9	10			p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. formate ion.	730122
26.306	**4-Nitroanisole**							
	$^{\bullet}CO_2^- + 4\text{-}CH_3OC_6H_4NO_2 \rightarrow CO_2 + [4\text{-}CH_3OC_6H_4NO_2]^{\bullet -}$	1.2×10^8	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.307	**4-Nitrobenzaldehyde**							
	$^{\bullet}CO_2^- + 4\text{-}O_2NC_6H_4CHO \rightarrow CO_2 + [4\text{-}NO_2C_6H_4CHO]^{\bullet -}$	2.6×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.308	**4-Nitrobenzaldoxime**							
	$^{\bullet}CO_2^- + HON\text{-}CHC_6H_4\text{-}4\text{-}NO_2 \rightarrow CO_2 + [HON\text{-}CHC_6H_4\text{-}4\text{-}NO_2]^{\bullet -}$	1.4×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.309	**4-Nitrobenzamide**							
	$^{\bullet}CO_2^- + 4\text{-}O_2NC_6H_4CONH_2 \rightarrow CO_2 + [4\text{-}NO_2C_6H_4CONH_2]^{\bullet -}$	1.2×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.310	**Nitrobenzene**							
	$^{\bullet}CO_2^- + C_6H_5NO_2 \rightarrow CO_2 + [C_6H_5NO_2]^{\bullet -}$	4.6×10^8 7.5×10^8 5.8×10^8	0 2.5 9.4			p.r.	P.b.k.	730085
		5.6×10^8 1.0×10^9	~3 6-7			p.r.	P.b.k. at 295 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} formate.	700303
26.311	**4-Nitrobenzenesulfonamide**							
	$^{\bullet}CO_2^- + 4\text{-}O_2NC_6H_4SO_2NH_2 \rightarrow CO_2 + [4\text{-}NO_2C_6H_4SO_2NH_2]^{\bullet -}$	1.1×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.312	**4-Nitrobenzenesulfonate ion**							
	$^{\bullet}CO_2^- + 4\text{-}O_2NC_6H_4SO_3^- \rightarrow CO_2 + [4\text{-}O_2NC_6H_4SO_3]^{\bullet 2-}$	1.3×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.313	**2-Nitrobenzoate ion**							
	$^{\bullet}CO_2^- + 2\text{-}NO_2C_6H_4CO_2^- \rightarrow CO_2 + [2\text{-}NO_2C_6H_4CO_2^-]^{\bullet -}$	2.4×10^8	0.8, 7			p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	761111
26.314	**3-Nitrobenzoate ion**							
	$^{\bullet}CO_2^- + 3\text{-}NO_2C_6H_4CO_2^- \rightarrow CO_2 + [3\text{-}NO_2C_6H_4CO_2]^{\bullet 2-}$	6.3×10^8	0.8, 7			p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	761111

TABLE 26. Carbon dioxide radical anion — Continued

Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.315 **4-Nitrobenzoate ion**							
$^{\bullet}CO_2^- + 4\text{-}NO_2C_6H_4CO_2^- \rightarrow CO_2 + [4\text{-}NO_2C_6H_4CO_2^-]^{\bullet -}$	7.4×10^8	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
	8.0×10^8	0.8, 7			p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	761111
26.316 **4-Nitrobenzonitrile**							
$^{\bullet}CO_2^- + 4\text{-}O_2NC_6H_4CN \rightarrow CO_2 + [4\text{-}NO_2C_6H_4CN]^{\bullet -}$	2.1×10^9	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.317 **5-Nitro-2-furaldehyde semicarbazone**							
$^{\bullet}CO_2^- + NF \rightarrow CO_2 + NF^{\bullet -}$	2.0×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} of the nitrofuran.	90A467
26.318 **5-Nitro-2-furoate ion**							
$^{\bullet}CO_2^- + NF \rightarrow CO_2 + NF^{\bullet -}$	1.2×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} of the nitrofuran.	90A467
26.319 **2-Nitroimidazole**							
$^{\bullet}CO_2^- + (ImH)\text{-}NO_2 \rightarrow CO_2 + (ImH)\text{-}NO_2^{\bullet -}$	1.1×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
26.320 **2-Nitroimidazole, conjugate acid**							
$^{\bullet}CO_2^- + (ImH_2^+)\text{-}NO_2 \rightarrow CO_2 + (ImH_2^+)\text{-}N\dot{O}_2H$	1.3×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} formic acid and 0.001 mol L^{-1} nitroimidazole; $pK_a = -0.75, 7.0$.	90A467
26.321 **2-Nitroimidazole, conjugate base**							
$^{\bullet}CO_2^- + (Im^-)\text{-}NO_2 \rightarrow CO_2 + (Im^-)\text{-}NO_2^{\bullet -}$	4.0×10^7				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
26.322 **4-Nitroimidazole**							
$^{\bullet}CO_2^- + (ImH)\text{-}NO_2 \rightarrow CO_2 + (ImH)\text{-}NO_2^{\bullet -}$	6.0×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
	6.3×10^8 6.1×10^8 2.2×10^8	4 6 8			p.r.	P.b.k. in buffered N_2O-satd. soln. contg. 0.1 or 1 mol L^{-1} formate contg. $(0.1\text{-}1) \times 10^{-3}$ mol L^{-1} nitroimidazole; $pK_a = -0.2, 9.4$.	87A208
26.323 **4-Nitroimidazole, conjugate acid**							
$^{\bullet}CO_2^- + (ImH_2^+)\text{-}NO_2 \rightarrow CO_2 + (ImH_2^+)\text{-}N\dot{O}_2H$	1.1×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} formic acid and 0.001 mol L^{-1} nitroimidazole; $pK_a = -0.20, 9.4$.	90A467
26.324 **4-Nitroimidazole, conjugate base**							
$^{\bullet}CO_2^- + (Im^-)\text{-}NO_2 \rightarrow CO_2 + (Im^-)\text{-}NO_2^{\bullet -}$	5.0×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.001 mol L^{-1} nitroimidazole.	90A467
	1.4×10^8	11.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 or 1 mol L^{-1} formate and $(0.1\text{-}1) \times 10^{-3}$ mol L^{-1} nitroimidazole.	87A208
26.325 ***aci*-Nitromethane anion**							
$^{\bullet}CO_2^- + CH_2NO_2^- \rightarrow {}^-O_2CCH_2\dot{N}O_2^-$	1.4×10^7	11.3		~285	p.r.	P.b.k. (esr) in N_2O-satd. soln. contg. $(0.5\text{-}5) \times 10^{-3}$ mol L^{-1} nitromethane and 0.1 mol L^{-1} formate ion.	88D069
26.326 **5-(*p*-Nitrophenyl)-2,3-diphenyltetrazolium**							
$^{\bullet}CO_2^- + p\text{-}NTB^+ \rightarrow CO_2 + p\text{-}NTB^{\bullet}$	1.9×10^9	10.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate and 5×10^{-5} mol L^{-1} p-NTB.	88G273
26.327 **2-(*p*-Nitrophenyl)-3,5-diphenyltetrazolium**							
$^{\bullet}CO_2^- + p\text{-}NTC^+ \rightarrow CO_2 + p\text{-}NTC^{\bullet}$	5.0×10^9	10.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate.	88G273

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.328	**Nitrosobenzene**							
	$^{\bullet}CO_2^- + C_6H_5NO \rightarrow CO_2 + C_6H_5\dot{N}O^-$	4.0×10^9				p.r.	P.b.k. at 450 nm in soln. contg. formate ion.	660433
26.329	***p*-Nitro-α,α,α-trifluorotoluene**							
	$^{\bullet}CO_2^- + 4\text{-}CF_3C_6H_4NO_2 \rightarrow CO_2 + 4\text{-}CF_3C_6H_4NO_2^{\bullet -}$	$\sim 1 \times 10^9$	7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	84A305
26.330	**Perylene**							
	$^{\bullet}CO_2^- + Per \rightarrow CO_2 + Per^{\bullet -}$	2.9×10^{10}				p.r.	P.b.k. at 580 nm in soln. contg. 0.066 mol L^{-1} CO_2 and $(0.5\text{-}4) \times 10^{-5}$ mol L^{-1} perylene.	92A233
26.331	**1,10-Phenanthroline-5,6-dione**							
	$^{\bullet}CO_2^- + 1,10\text{-PD} \rightarrow CO_2 + [1,10\text{-PD}]^{\bullet -}$	1.8×10^9	7.2		298	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	90A247
26.332	**1,7-Phenanthroline-5,6-dione**							
	$^{\bullet}CO_2^- + 1,7\text{-PD} \rightarrow CO_2 + [1,7\text{-PD}]^{\bullet -}$	1.8×10^9	7.2		298	p.r.	P.b.k. at 630 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	90A247
26.333	**Phenyl-*N*-*tert*-butylnitrone**							
	$^{\bullet}CO_2^- + PBN \rightarrow$	1.5×10^7				p.r.	Abs. changes in soln. contg. formate.	82A184
26.334	**Phenylthiourea**							
	$^{\bullet}CO_2H + C_6H_5NHCSNH_2 \rightarrow$	1.1×10^9	<0			p.r.	P.b.k. at 410 nm in soln. contg. 3.5 mol L^{-1} H_2SO_4. Yield of reduced species was lower at reduced acid concn.	94A002
26.335	**Primaquine**							
	$^{\bullet}CO_2^- + PQ \rightarrow CO_2 + PQ^{\bullet -}$	$<10^7$ $\sim 1.3 \times 10^9$	~7 ~3.3			p.r.	P.b.k. at 480-500 nm in soln. contg. formate ion; pK = 3.5; k from graph.	88A471
26.336	**Pterin**							
	$^{\bullet}CO_2^- + PnH + H^+ \rightarrow CO_2 + PnH_2^{\bullet}$	4.5×10^8	7		296	p.r.	P.b.k. in air-free soln. contg. $(2\text{-}10) \times 10^{-4}$ mol L^{-1} pterin, phosphate buffer and formate ion.	91A410
		4.6×10^8 $\ll 10^7$	7.0 9.5-13			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion; 100% *e*-transfer at pH 7; no *e*-transfer obs. at pH 9.5-13.	761060
26.337	**Pterin-6-carboxylate**							
	$^{\bullet}CO_2^- + Pn6CB + H^+ \rightarrow CO_2 + Pn6CBH^{\bullet}$	1.7×10^8	7		296	p.r.	P.b.k. in air-free soln. contg. $(2\text{-}10) \times 10^{-4}$ mol L^{-1} pterin-6-carboxylate, phosphate buffer and formate ion.	91A410
26.338	**Purine**							
	$^{\bullet}CO_2^- + C_5H_4N_4 \rightarrow$	$<10^7$	6.0			p.r.	P.b.k. in N_2O-satd. soln.	751060
26.339	**Pyrazine**							
	$^{\bullet}CO_2^- + pz \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	741127
26.340	**Pyridazine**							
	$^{\bullet}CO_2^- + pdz \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	741127
26.341	**2-Pyridinecarboxylic acid**							
	$^{\bullet}CO_2^- + 2\text{-}pyH^+CO_2^- + H^+ \rightarrow CO_2 + 2\text{-}pyH^+(H)CO_2^-$	2.3×10^8	3.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} formate; pK_a = 0.79, 5.39.	92A458
		2.7×10^8	4.2			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion; pK_a = 5.32; no reaction obs. with unprotonated form.	88A250

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
26.342	**3-Pyridinol**							
	$^{\bullet}CO_2^- + 3\text{-pyOH} \rightarrow$ addn.	7.8×10^7	6.8			p.r.	C.k. rel. to $k(CO_2^- + MB^+) = 8.5 \times 10^9$ L mol^{-1} s^{-1}.	90A329
26.343	**3-Pyridinol, conjugate acid**							
	$^{\bullet}CO_2^- + 3\text{-HOpyH}^+ \rightarrow$ addn.	4.8×10^8	2.6			p.r.	P.b.k. at 405 and 425 nm in N_2O-satd. soln. contg. 1 mol L^{-1} formic acid and 0.18 mol L^{-1} formate.	90A329
26.344	**α-(4-Pyridyl 1-oxide)-*N*-*tert*-butylnitrone**							
	$^{\bullet}CO_2^- + 4\text{-POBN} \rightarrow 4\text{-POBN-}CO_2^-$	6.1×10^8	11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	84A426
26.345	**Pyrimidine**							
	$^{\bullet}CO_2^- + Pm \rightarrow$	$\ll 10^7$	5.0, 11.0			p.r.	P.b.k. in N_2O-satd. soln. contg. formate ion.	741127
26.346	**Rhodamine B**							
	$^{\bullet}CO_2^- + Rh\ B \rightarrow CO_2 + Rh\ B_{red}$	1.8×10^8				p.r.	D.k. at 510 nm as well as p.b.k. at 410 nm in soln. contg. 0.1 mol L^{-1} formate ion.	676053
26.347	**Riboflavine**							
	$^{\bullet}CO_2^- + RF \rightarrow CO_2 + [RF]^{\bullet -}$	1.7×10^9	7.0			p.r.	P.b.k. at 560 nm in N_2O-satd. soln. contg. formate ion; *e*-transfer.	731104
		3.0×10^9 3.6×10^9	–2 3,5.9			p.r.	D.k. at 420 nm, as well as p.b.k. at 560 nm (semiquinone) in N_2O-satd. soln. contg. formate ion.	690283
		1.4×10^9	11.5-13			p.r.	D.k. at 460 nm, as well as p.b.k. at 360 nm (semiquinone) in N_2O-satd. soln. contg. formate ion.	690283
26.348	**Rose Bengal dianion**							
	$^{\bullet}CO_2^- + RB \rightarrow CO_2 + RB^{\bullet -}$	3.2×10^8	7			p.r.	P.b.k. N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	90A430
26.349	**Tetracycline**							
	$^{\bullet}CO_2^- + TC \rightarrow CO_2 + TC^{\bullet -}$	1.6×10^8	6.8			p.r.	P.b.k. at 630 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	94A209
26.350	**Tetrafluoro-1,4-benzoquinone**							
	$^{\bullet}CO_2^- + F_4Q \rightarrow CO_2 + F_4Q^{\bullet -}$	2.5×10^9	5.9			p.r.	P.b.k. at 435 nm in N_2O-satd. soln. contg. 1 mol L^{-1} formate.	94A417
26.351	**1,1'-Tetramethylene-2,2'-bipyridinium**							
	$^{\bullet}CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\bullet +}$	9×10^9	7.0	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.002 mol L^{-1} phosphate buffer.	84A292
		7×10^9	6.8	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	78A321
26.352	**4,5,4',5'-Tetramethyl-1,1'-ethylene-2,2'-bipyridinium**							
	$^{\bullet}CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\bullet +}$	9×10^9	7.0			p.r.	P.b.k. at ~380 nm in O_2-free soln.	84A292
26.353	**2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl**							
	$^{\bullet}CO_2^- + TAN \rightarrow$ addn.	5.4×10^8	7-8			p.r.	C.k. in N_2O-satd. soln. contg. formate. rel. to $k(^{\bullet}CO_2^- + Fe(CN)_6^{3-}) = 1.1 \times 10^9$ L mol^{-1} s^{-1}.	710618
		7.0×10^8	7-8			p.r.	P.b.k. at 310 nm in N_2O-satd. soln. contg. formate.	710618
26.354	**4,5,4',5'-Tetramethyl-1,1'-tetramethylene-2,2'-bipyridinium**							
	$^{\bullet}CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\bullet +}$	4.2×10^9	7.0			p.r.	P.b.k. at ~380 nm in O_2-free soln.	84A292

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
26.355	**4,5,4',5'-Tetramethyl-1,1'-trimethylene-2,2'-bipyridinium**							
	$^{\bullet}CO_2^- + BP^{2+} \rightarrow CO_2 + BP^{\bullet+}$	6.3×10^9	7.0			p.r.	P.b.k. at ~380 nm in O_2-free soln.	84A292
26.356	**Tetranitromethane**							
	$^{\bullet}CO_2^- + C(NO_2)_4 \rightarrow CO_2 + C(NO_2)_3^- + {}^{\bullet}NO_2$	4×10^9	3-7			p.r.	P.b.k.	700303
26.357	**2-Thioriboflavine**							
	$^{\bullet}CO_2^- + Fl \rightarrow CO_2 + Fl^{\bullet-}$	4.0×10^9 1.3×10^9	7 10		297	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. 0.02 mol L^{-1} formate, 0.01 mol L^{-1} phosphate buffer.	86B055
26.358	**Thiosemicarbazide**							
	$^{\bullet}CO_2H + NH_2NHCSNH_2 \rightarrow$	5.0×10^8	<0			p.r.	P.b.k. at 400 nm in soln. contg. 3.6 mol L^{-1} H_2SO_4 and 1 mol L^{-1} formate. Mechanism suggested to be protonation at S and H abstr. from NH.	94A284
26.359	**Thymine**							
	$^{\bullet}CO_2^- + 5\text{-MeU} \rightarrow$	$\sim 5 \times 10^4$	7-8			γ-r.	Estd. from dependence of $G(-T)$ on thymine concn. in soln. contg. formate and N_2O; used $2k(^{\bullet}CO_2^- + {}^{\bullet}CO_2^-) = 1 \times 10^9\ L\ mol^{-1}\ s^{-1}$.	701103
26.360	**1,1'-Trimethylene-2,2'-bipyridinium**							
	$^{\bullet}CO_2^- + TQ^{2+} \rightarrow CO_2 + TQ^{\bullet+}$	1.1×10^{10}	7.0	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 2×10^{-3} mol L^{-1} phosphate buffer.	84A292
		1.1×10^{10}	6.8	0.1		p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	78A321
26.361	**2,4,6-Trinitrobenzoate ion**							
	$^{\bullet}CO_2^- + 2,4,6\text{-}(NO_2)_3C_6H_2CO_2^- \rightarrow CO_2 + [2,4,6\text{-}(NO_2)_3C_6H_2CO_2]^{\bullet 2-}$	3.4×10^9	0.8, 7			p.r.	P.b.k. in N_2O-satd. soln. contg. formate.	761111
26.362	**2,3,5-Triphenyltetrazolium**							
	$^{\bullet}CO_2^- + TT^+ \rightarrow CO_2 + TT^{\bullet}$	1.1×10^9	10.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.2 mol L^{-1} formate and 10^{-4} mol L^{-1} TT.	88G273
26.363	**Tryptophan**							
	$^{\bullet}CO_2^- + TrpH \rightarrow$	$<10^5$	7		293	p.r.	Abs. changes in N_2O-satd. soln. contg. phosphate buffer.	88A251
26.364	**Tyrosine**							
	$^{\bullet}CO_2^- + TyrOH \rightarrow$	$<10^5$	7		293	p.r.	Abs. changes in N_2O-satd. soln. contg. phosphate buffer.	88A251
26.365	**Aponeocarzinostatin**							
	$^{\bullet}CO_2^- + NCS \rightarrow$	2.3×10^8 4.2×10^7	3.2 8.2			p.r.	P.b.k. at 425 nm; k for total reaction, relative to total protein concn.; 1 reducible disulfide group per mole of protein.	90A416
26.366	**Ascorbate oxidase**							
	$^{\bullet}CO_2^- + AAO(Cu^{II}) \rightarrow CO_2 + AAO(Cu^{I})$	1.1×10^9	7.0	0.1	292	p.r.	D.k. at 610 nm in soln. contg. formate; concn. adjusted so only one Cu per monomer unit (contg. 4 Cu) was reduced.	93A158
26.367	**Azurin**							
	$^{\bullet}CO_2^- + Cu^{II}\text{-azurin} \rightarrow$	1.5×10^8 1.8×10^8	7.0		298	p.r.	D.k. at 625 nm (Cu(II)) and p.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; protein from Alcaligenes faecalis.	92A224

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T (K)	Method	Comment	Ref.
26.367	**Azurin** — Continued							
		2.1×10^8 3.5×10^8	7.0		298	p.r.	D.k. at 625 nm (Cu(II)) and p.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; protein from Pseudomonas fluorescens B.	92A224
		5.0×10^8 2.6×10^8	7.0		298	p.r.	D.k. at 625 nm (Cu(II)) and p.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; protein from Pseudomonas aeruginosa.	89R267
		6.0×10^8 4.8×10^8	7.0		298	p.r.	D.k. at 625 nm (Cu(II)) and p.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; protein from Alcaligenes spp. (Iwasaki).	89R267
26.368	**Carboxypeptidase A**							
	$^{\bullet}CO_2^- + CPD\text{-}A \rightarrow e.t.$	7×10^8				p.r.	P.b.k. at 410 nm (electron adduct).	731060
26.369	**Ceruloplasmin**							
	$^{\bullet}CO_2^- + Cp\text{-}Cu(II) \rightarrow$	4×10^9					Unpublished data., I. Pecht and M. Faraggi.	731064
26.370	**Cytochrome C**							
	$^{\bullet}CO_2^- + Cyt\ C\ (Fe^{3+}) \rightarrow CO_2 + Cyt\ C\ (Fe^{2+})$	7.0×10^8	7	0.16	293	p.r.	D.k. at 320 to 550 nm in N_2O-satd. soln. contg. 2×10^{-3} mol L^{-1} phosphate and 0.16 mol L^{-1} formate; cytochrome C from yeast (Hansenula anomala).	86A394
		2×10^9	7.0	0.003	294	p.r.	P.b.k. at 550 nm in N_2O-purged soln. contg. 0.002 mol L^{-1} formate, 0.001 mol L^{-1} phosphate and 10^{-5} mol L^{-1} cyt C; $E_a = 14$ kJ mol^{-1}, studied at 285-313 K.	82A281
		2.1×10^9	7.0	0.1	295	p.r.	P.b.k. at 550 nm in soln. contg. 1.85×10^{-5} mol L^{-1} cyt C, 0.1 mol L^{-1} formate and 0.001 mol L^{-1} phosphate buffer.	82A366
		1.0×10^8	~7	0.1		p.r.	P.b.k. at 550 nm in soln. contg. formate.	79A312
		1.3×10^9	7.0	0.01		p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate.	78A288
		7×10^8 5.0×10^8	7.4 8.5	0.1	293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	771096
		9.4×10^8 7.4×10^8	2.0 6.7			p.r.	P.b.k.	771128
		1.0×10^9 6.3×10^8	6.2 8.7	0.1	293	p.r.	Abs. change at 450 and 550 nm in soln. contg. 0.1 mol L^{-1} formate; at pH 6.2 $E_a = 11$ kJ mol^{-1} and $A = 1.0 \times 10^{11}$; studied at 278-313 K; ionic strength effects studied.	761127
		6.9×10^8 2.5×10^8	7 10.8	~0.03		p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. formate.	751012
		2.8×10^9 7.9×10^8	2 7	0.1		p.r.	P.b.k. at 550 nm in soln. contg. 0.03-1 mol L^{-1} formate; ionic strength effects studied.	710327
26.371	***Cytochrome C, ruthenium(III)-modified***							
	$^{\bullet}CO_2^- + Fe^{3+}\ Cyt\ c\ (Ru^{3+}) \rightarrow CO_2 + Fe^{3+}\ Cyt\ c\ (Ru^{2+})$	5.4×10^9	7.0			p.r.	P.b.k. at 550 nm in soln. cont. 0.1 mol L^{-1} formate and 0.1 mol L^{-1} phosphate buffer.	84A062
	$^{\bullet}CO_2^- + Fe^{3+}\ Cyt\ c\ (Ru^{3+}) \rightarrow CO_2 + Fe^{2+}\ Cyt\ c\ (Ru^{3+})$	1.8×10^9	7.0			p.r.	P.b.k. at 550 nm in soln. cont. 0.1 mol L^{-1} formate and 0.1 mol L^{-1} phosphate buffer.	84A062
26.372	**Cytochrome C, acetylated**							
	$^{\bullet}CO_2^- + Ac\text{-}cyt\ C \rightarrow$	1.5×10^9	~7	0.1		p.r.	P.b.k. at 550 nm in soln. contg. formate; ionic strength effects studied.	79A312

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.373	**Cytochrome C, carboxymethylated**							
	$^{\bullet}CO_2^- + Cxm\text{-}cyt\ C \rightarrow$	1.3×10^8	~7	0.1		p.r.	P.b.k. at 550 nm in soln. contg. formate.	79A312
		1.4×10^8	7			p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate ion.	78A288
26.374	**Cytochrome C, succinylated**							
	$^{\bullet}CO_2^- + Succ\text{-}cyt\ C \rightarrow$	4.0×10^9	~7	0.1		p.r.	P.b.k. at 550 nm in soln. contg. formate.	79A312
26.375	**Cytochrome C_3**							
	$^{\bullet}CO_2^- + cyt\ C_3 \rightarrow$	2.1×10^8	8.1			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.16 mol L^{-1} formate; used $2k(^{\bullet}CO_2^- + {}^{\bullet}CO_2^-) = 1.8 \times 10^9$ L $mol^{-1}\ s^{-1}$; from D. vulgaris; only 2 of the hemes react.	78A232
26.376	**Cytochrome P-450**							
	$^{\bullet}CO_2^- + cyt\ P\text{-}450 \rightarrow$					p.r.	No redn. obs. in N_2O-satd. soln. contg. formate.	79A036
26.377	**Cytochrome c 551**							
	$^{\bullet}CO_2^- + cyt\ C\ 551 \rightarrow$ redn.	1.1×10^9	7	0.31	~293	p.r.	P.b.k. at 551 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.1 mol L^{-1} phosphate.	88A366
		3.7×10^9	5.6	0.1		p.r.	P.b.k. at 550 nm in soln. contg. 0.01-0.1 mol L^{-1} formate.	84A430
		7.4×10^8	7.0	0.1				
		4.5×10^8	7.0	0.01				
26.378	**Cytochrome c 551, ruthenium(III)-modified**							
	$^{\bullet}CO_2^- + Fe^{3+}\ cyt\ C\ 551\ (Ru^{3+}) \rightarrow$ redn.	1.9×10^9	7	0.31	~293	p.r.	P.b.k. at 551 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate, 0.1 mol L^{-1} phosphate; reduction of Fe^{III}/Fe^{II}:Ru^{III}/Ru^{II} ~9:1	88A366
26.379	**Daunorubicin, apo-riboflavin binding protein complex**							
	$^{\bullet}CO_2^- + D\text{-}apo\text{-}RBP \rightarrow$	2.4×10^8	7			p.r.	P.b.k. in soln. contg. $(5\text{-}10) \times 10^{-5}$ mol L^{-1} complex with apo-RBP; semiquinone formn.	89A450
26.380	**Daunorubicin-DNA complex**							
	$^{\bullet}CO_2^- + D\text{-}DNA \rightarrow CO_2 + D^{\bullet-}\text{-}DNA$	1.9×10^8	7			p.r.	P.b.k. in soln. contg. 0.1 mol L^{-1} formate and (1-4) β 10^{-4} mol L^{-1} complex, [daunorubicin]/[DNA] 1/10 or 1/20.	91A258
26.381	**Deoxyribonucleic acid**							
	$^{\bullet}CO_2^- + DNA \rightarrow$	2.5×10^4	9.2			γ-r.	Estd. from D_{37} values at various dose rates in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate, 0.01 mol L^{-1} $MgCl_2$, 0.01 mol L^{-1} tetraborate and single stranded ΦX174 DNA.	83R032 88R099
26.382	**Ferredoxin, oxidized**							
	$^{\bullet}CO_2^- + [Fe_2S_2(SCys)_4]^{2-} \rightarrow CO_2 + [Fe_2S_2(SCys)_4]^{3-}$	6.2×10^7	7.3		297	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. 1.0 mol L^{-1} formate.	81A279
		8.0×10^7	7.5			p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	731064
26.383	**Ferredoxin-NADP reductase**							
	$^{\bullet}CO_2^- + FNR\text{-}FAD + H^+ \rightarrow CO_2 + FNR\text{-}FADH^{\bullet}$	$\leq 3 \times 10^7$	7.1		298	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	82R184
26.384	**Flavocytochrome b_2 (Fe^{3+})**							
	$^{\bullet}CO_2^- + Fl\ b_2\ (Fe^{3+}) \rightarrow CO_2 + Fl\ b_2\ (Fe^{2+})$	2.1×10^8	7.0	0.16		p.r.	D.k. at 547 and 440 nm in N_2O-satd. soln. contg. formate and phosphate buffer; used $2k(^{\bullet}CO_2^- + {}^{\bullet}CO_2^-) = 1.1 \times 10^9$ L $mol^{-1}\ s^{-1}$	84A153

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.385	**Glucose oxidase**							
	$^{\bullet}CO_2^- + GOX\text{-}F \rightarrow CO_2 + GOX\text{-}FH^{\bullet}$	2.5×10^8	6.0			p.r.	P.b.k. at 560 nm in deaerated soln. contg. 3.5×10^{-5} mol L^{-1} GOX and 0.1 mol L^{-1} formate; nearly quantitative electron transfer.	84A473
26.386	**α-Hemoglobin**							
	$^{\bullet}CO_2^- + Fe(III)\ \alpha\text{-Hb} \rightarrow CO_2 + Fe(II)\ \alpha\text{-Hb}$	2.1×10^9	7.0			p.r.	P.b.k. at 450 and 570 nm as well as d.k. at 500 and 430 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} formate.	88R111
26.387	**α-Hemoglobin Cys-104 disulfide with 5-thio-2-nitrobenzoic acid**							
	$^{\bullet}CO_2^- + Fe(III)\ \alpha\text{-Hb-SSR} \rightarrow CO_2 + Fe(III)\ \alpha\text{-Hb-SSR}^{\bullet -}$	2.2×10^8	7			p.r.	P.b.k. at 420 nm in N_2O-satd. soln. contg. 0.1-0.2 mol L^{-1} formate and $(1\text{-}10) \times 10^{-5}$ mol L^{-1} Fe(III)-α-Hb-SSR.	88R111
26.388	**High-potential iron-sulfur protein (Chromatium vinosum D), reduced**							
	$^{\bullet}CO_2^- + Hipip_r \rightarrow$		7.0			p.r.	No reaction obs. in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate contg. 5.0×10^{-3} mol L^{-1} phosphate.	80A432
26.389	**Immunoglobulin G (bovine)**							
	$^{\bullet}CO_2^- + IgG \rightarrow$	1.3×10^9 1.2×10^8	3.2 8.2			p.r.	P.b.k. at 440 nm; k for total reaction, relative to total protein concn.; 7 reducible disulfide groups per mole of protein.	90A416
26.390	**Laccase**							
	$^{\bullet}CO_2^- + Cu\text{-OXD} \rightarrow$ addn.	$\geq 7 \times 10^9$	6.0			p.r.	Abs. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 0.01 mol L^{-1} phosphate; addn. followed by Cu^{2+} redn.; complex kinetics.	82A422
26.391	**Lysozyme**							
	$^{\bullet}CO_2^- + C_{99} \rightarrow$ redn.	1.5×10^8				p.r.	P.b.k. at 410 nm in soln. contg. 1.6×10^{-5} mol L^{-1} protein; used $k(^{\bullet}CO_2^- + {}^{\bullet}CO_2^-) = 1.5 \times 10^9$ L $mol^{-1}\ s^{-1}$.	82A466
		$\sim 9 \times 10^8$ $\sim 5 \times 10^8$ $\sim 3.5 \times 10^8$	4.8 6 10.8			p.r.	P.b.k. at 420 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate and 2×10^{-4} mol L^{-1} lysozyme; value from graph.	751080
26.392	**Melanin (from DOPA)**							
	$^{\bullet}CO_2^- + DOPA_{mel} \rightarrow$ redn.	$10^6\text{-}10^7$	7.4			p.r.	D.k. in soln. contg. 0.1 mol L^{-1} formate; k based on monomer of mol. wt. 150; from autoxidation of DL-dihydroxyphenylalanine.	86A227
26.393	**Methemerythrin**							
	$^{\bullet}CO_2^- + Fe(III)_2HrSH \rightarrow$	5.1×10^7			298	p.r.	D.k. at 350 nm; electron transfer at unknown protein site is followed by electron transfer to the iron.	90R009
		6.8×10^7	8.2	0.03		p.r.	D.k. at 360 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate; octamer from T. pyroides.	79A204
26.394	**Methemerythrin disulfide**							
	$^{\bullet}CO_2^- + Fe(III)_2HrSSR \rightarrow CO_2 + Fe(III)_2HrSSR^{\bullet -}$	5.7×10^8	7		298	p.r.	P.b.k. at 410 nm in N_2O-satd. soln. contg. $(1\text{-}17) \times 10^{-5}$ mol L^{-1} methemerythrin disulfide and 0.1 mol L^{-1} formate ion.	90R009
26.395	**Methemoglobin**							
	$^{\bullet}CO_2^- + Fe^{3+}\ Hb \rightarrow$	$<8 \times 10^6$	9			p.r.	Abs. changes at 550 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate ion.	81R003

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
26.396	**Metmyoglobin**							
	$^{\bullet}CO_2^- + Fe^{3+}Mb \rightarrow CO_2 + Fe^{2+}Mb$	2×10^8	7.0		298	p.r.	P.b.k. at 434 nm in N_2O-satd. soln. contg. 0.012 mol L^{-1} formate ion and (0.5-10) $\times$ 10^{-6} mol L^{-1} horse heart metmyoglobin.	94R065
		2.9×10^9	8.2	0.03		p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate ion.	79A204
		2.0×10^9	7			p.r.	Abs. changes in soln. contg. 0.01 mol L^{-1} formate.	78A288
26.397	**Plastocyanin**							
	$^{\bullet}CO_2^- + Cu^{II}$-plastocyanin $\rightarrow$	3.0×10^8	7.0	0.1	293	p.r.	D.k. at 597 nm (Cu^{II} redn.) in soln. contg. 1.2 $\times$ 10^{-3} mol L^{-1} formate.	90A259 93R003
		8×10^8	7	0.31	~293	p.r.	D.k. (Cu^{II}) in N_2O-satd. soln. contg. 0.10 mol L^{-1} formate and 0.1 mol L^{-1} phosphate; A. variabilis or S. obliquus plastocyanin (PCu^{II})	88A268
26.398	**Plastocyanin (Cu^{II} Tyr83NO_2 deriv.)**							
	$^{\bullet}CO_2^- + Cu^{2+}P(Tyr83NO_2) \rightarrow$	5.7×10^8	7.0	0.1	293	p.r.	D.k. at 597 nm (Cu^{II} redn.) in soln. contg. 1.2 $\times$ 10^{-3} mol L^{-1} formate.	90A259 93R003
26.399	**Plastocyanin, ruthenium(III)-modified**							
	$^{\bullet}CO_2^- + Cu^{II}Ru^{III}$-Plastocyanin $\rightarrow$	7×10^8	7	0.31	~293	p.r.	D.k. (Cu^{II}) in N_2O-satd. soln. contg. 0.10 mol L^{-1} formate; 72% Cu^{II} redn. ($\rightarrow$ stable $PCu^{I}Ru^{III}$) and 28% Ru^{III} redn. ($\rightarrow$ transient $PCu^{II}Ru^{II}$); A. variabilis plastocyanin (PCu^{II}) treated with $Ru(NH_3)_5H_2O^{2+}$, modified His-59.	88A268
		7×10^8	7.0			p.r.	D.k. at 597 nm (Cu^{II}) in N_2O-satd. soln. contg. 0.10 mol L^{-1} phosphate and 0.10 mol L^{-1} formate; Plastocyanin from A. variabilis modified by addn. of $Ru(NH_3)_6^{3+}$ to His59; 65% redn. at Cu, 35% redn. at Ru.	87A033
26.400	**Riboflavine binding protein**							
	$^{\bullet}CO_2^- + RBP \rightarrow$	1.2×10^9 1.7×10^8	3.2 8.2	0.16		p.r.	P.b.k. at 425 nm; k for total reaction, relative to total protein concn.; 9 reducible disulfide groups per mole of protein; obs. disulfide radical anion formation.	91R292 90A416
		6.4×10^7	7			p.r.	P.b.k. in soln. contg. (2-10) $\times$ 10^{-4} mol L^{-1} apo-RPB; disulfide radical anion formn.	89A450
		7.0×10^7 2.6×10^7 2.2×10^7	5.2 7.0 9.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate; flavin reduction rate.	85A169
26.401	**Ribonuclease**							
	$^{\bullet}CO_2^- + RNase \rightarrow$	3×10^8	7.3			p.r.	C.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} format; rel. to $k(^{\bullet}CO_2^- + \text{lipoate}) = 4.1 \times 10^8$ $L\ mol^{-1}\ s^{-1}$.	85A169
26.402	**Serum albumin (bovine)**							
	$^{\bullet}CO_2^- + BSA \rightarrow$ e.t.	8×10^8 7×10^8	6.4 7.6			p.r.	P.b.k. at 420 nm $(RSSR)^-$ in N_2O-satd. soln. contg. 0.1 mol L^{-1} formate.	83A083
26.403	**Stellacyanin**							
	$^{\bullet}CO_2^- + Cu^{II}$-stellacyanin $\rightarrow CO_2 +$ St[Cu(I)]	8.3×10^8	7.0		291	p.r.	D.k. at 605 nm in N_2O-satd. buffer-free soln. contg. 0.1 mol L^{-1} formate.	89R079
26.404	**Stellacyanin, ruthenium(III) modified**							
	$^{\bullet}CO_2^- +$ Ru(III)-St[Cu(II)] $\rightarrow CO_2 +$ Ru(II)-St[Cu(II)]	1.2×10^9	7.0		298	p.r.	D.k. at 310 nm in N_2O-satd. buffer-free soln. contg. 0.1 mol L^{-1} formate ion.	90A402

TABLE 26. Carbon dioxide radical anion — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T (K)	Method	Comment	Ref.
26.404	**Stellacyanin, ruthenium(III) modified** — Continued							
		1.0×10^9	7.0		291	p.r.	D.k. at 310 nm in N_2O-satd. buffer-free soln. contg. 0.1 mol L^{-1} formate.	89R079
	$^{\bullet}CO_2^-$ + Ru(III)-St[Cu(II)] → CO_2 + Ru(III)-St[Cu(I)]	1×10^9	7.0		298	p.r.	D.k. at 605 nm in N_2O-satd. buffer-free soln. contg. 0.1 mol L^{-1} formate ion; $\Delta H‡ = 7$ kJ mol^{-1} and $\Delta S‡ = -50$ J K^{-1} mol^{-1}, studied at 276-313 K.	90A402
		8.5×10^8	7.0		291	p.r.	D.k. at 605 nm in N_2O-satd. buffer-free soln. contg. 0.1 mol L^{-1} formate.	89R079
26.405	**Superoxide dismutase**							
	$^{\bullet}CO_2^-$ + CuZnSOD →	1.2×10^{10}	8.5-9.5			p.r.	C.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} formate; rel. to $k(CO_2^- + FeTMpyP^{5+}) = 1.6 \times 10^{10}$ L mol^{-1} s^{-1}.	91A380
	$^{\bullet}CO_2^-$ + CuZnSOD → redn. of Cu(II)	7.9×10^8	6.8		298	p.r.	D.k. at 680 nm in N_2O-satd. soln. contg. 0.1-0.01 mol L^{-1} formate ion and 12.5-100 $\times$ 10^{-6} mol L^{-1} SOD; bovine liver enzyme (Cu^{2+}).	85A436
26.406	**Transferrin, dicupric complex**							
	$^{\bullet}CO_2^-$ + Cu(II)-Tf →	5.2×10^6	9			p.r.	Calcd from fraction Cu(II) reduced (obs. at 435 nm) and model including competing reactions, in 0.1 mol L^{-1} formate and 2.5 $\times$ 10^{-2} mol L^{-1} $KHCO_3$.	82A086
26.407	**Transferrin, diferric complex**							
	$^{\bullet}CO_2^-$ + Fe(III)-Tf →	3.8×10^8	7.0			p.r.	P.b.k. at 420 nm (protein reduction) in N_2O-satd. soln. contg. formate ion; bleaching at 465 nm (Fe^{III} reduction) gave an estimated $k = 2.1 \times 10^6$ L mol^{-1} s^{-1}.	87A281
		2.1×10^6	9			p.r.	Calcd. from fraction Fe(III) reduced (obs. at 470 nm) and model including competing reactions, in 0.1 mol formate and 2.5 $\times$ 10^{-2} mol L^{-1} $KHCO_3$.	82A086
26.408	**Transferrin, dimanganic complex**							
	$^{\bullet}CO_2^-$ + Mn(III)-Tf →	5.1×10^6	9			p.r.	Calcd. from fraction Mn(III) reduced (obs. at 420 nm) and model including competing reactions, in 0.1 mol formate and 2.5 $\times$ 10^{-2} mol L^{-1} $KHCO_3$.	82A086
26.409	**Trypsin**							
	$^{\bullet}CO_2^-$ + Tryp →	2.6×10^9	7		293	p.r.	C.k. rel. to $k(^{\bullet}CO_2^- + Q) = 6.7 \times 10^9$ L mol^{-1} s^{-1}.	88A251
26.410	**Zinc(II) insulin complex**							
	$^{\bullet}CO_2^-$ + Zn(Insulin)$^{2+}$ →	6×10^8	9.0	0.05		p.r.	P.b.k. at 420 nm in N_2O-satd. soln. contg. 10^{-2} mol L^{-1} formate; based on monomer concn. (1.5-2.0 $\times$ 10^{-5} mol L^{-1}); k decreased to 2 $\times$ 10^8 L mol^{-1} s^{-1} on the fourth pulse.	80A204

TABLE 27. Miscellaneous Substituted Alkyl Radicals

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.1	**Acetoxymethyl**							
27.1.1	**Oxygen**							
	$CH_3CO_2\dot{C}H_2 + O_2 \rightarrow AcOCH_2OO^{\bullet}$	1.4×10^{10}	6.4			p.r.	P.b.k. at 260 nm in N_2O/O_2 satd. soln. contg. methyl acetate and (6-26) $\times 10^{-5}$ mol L^{-1} oxygen.	78A402
27.2	**Acetylamino(carboxy)methyl, anion**							
27.2.1	**Hydroxide ion**							
	$CH_3CONH\dot{C}HCO_2^- + OH^- \rightarrow CH_3CON^-\dot{C}HCO_2^- + H_2O$	8×10^8	>13			*e*-r.	Estd. by esr from pH dependence of line width in N_2O-satd. soln. contg. acetylglycine; $k_r = 1.6 \times 10^7$ L mol^{-1} s^{-1}; ($pK_a = 14.0$).	765198
27.3	**(*N*-Acetylamino)methyl**							
27.3.1	***N*-Ethylmaleimide**							
	$CH_3CONH\dot{C}H_2$ + NEM → addn.	~10^8	6-7			p.r.	P.b.k. at 400 nm, 100% addn. based on abs. spectra; radical from *N*-methylacetamide.	720144
27.3.2	**2-Methyl-1,4-naphthoquinone**							
	$CH_3CONH\dot{C}H_2$ + 2-CH_3NQ →	2.0×10^9	6.0, 10.9			p.r.	P.b.k. at 395 nm in soln. contg. *N*-methylacetamide; 19% *e*-transfer.	731047
27.4	**1-Acetylamino-3-(methylthio)propyl**							
27.4.1	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$CH_3SCH_2CH_2\dot{C}HNHCOCH_3 + MV^{2+}$ → electron transfer	~1×10^7	4.7			p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. acetylmethionine.	83A200
27.5	**Acetylglycylglycinamide, radical anion**							
27.5.1	**2-Methyl-1,4-naphthoquinone**							
	$[AcGlyGlyNH_2]^{\bullet -}$ + 2-CH_3NQ → $[2\text{-}CH_3NQ]^{\bullet -}$ + other prod.	2.7×10^9	7.0			p.r.	P.b.k. at 395 nm; 99% *e*-transfer.	731047
27.6	**[(*N*-Acetyl-*N*-methyl)amino]carboxymethyl, anion**							
27.6.1	**2-Methyl-1,4-naphthoquinone**							
	$CH_3CON(CH_3)\dot{C}HCO_2^-$ + 2-CH_3NQ →	1.3×10^9 1.0×10^9	7.0 12.5			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. acetylsarcosine; 39% *e*-transfer at pH 7, 38% at pH 12.5.	731047
27.7	**(*N*-Acetyl-*N*-methylamino)methyl**							
27.7.1	**Pentacyanonitrosylferrate(II) ion**							
	$^{\bullet}CH_2N(CH_3)C(O)CH_3 + Fe(CN)_5NO^{3-}$ → $[Fe(CN)_5N(O)CH_2N(CH_3)C(O)CH_3]^{3-}$	3.5×10^{10}	6.0-7.5			p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *N*,*N*-dimethylacetamide and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
27.7.2	**Pentaamminenitrosylruthenium(II) ion**							
	$^{\bullet}CH_2N(CH_3)C(O)CH_3 + Ru(NH_3)_5NO^{2+}$ → $Ru(NH_3)_5N(O)CH_2N(CH_3)C(O)CH_3^{2+}$	2.9×10^9	6.0-7.5			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L^{-1} *N*,*N*-dimethylacetamide and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
27.8	**Acrylamide, radical anion**							
27.8.1	**Silver(I) ion**							
	$[CH_2CHCONH_2]^{\bullet -} + Ag^+ \rightarrow Ag^0 + H^+ + H_2C{=}CHCONH_2$	1.1×10^8	~6			p.r.	P.b.k. at 313 nm in soln. contg. acrylamide.	700052
27.8.2	**Water**							
	$[CH_2CHCONH_2]^{\bullet -} + H_2O \rightarrow CH_3\dot{C}HCONH_2 + OH^-$	$1.4 \times 10^5\ s^{-1}$	9.3-13			p.r.	D.k. in soln. contg. acrylamide and 0.001 mol L^{-1} borate buffer; general acid catalysis by buffer components, e.g. $B(OH)_3$, NH_4^+, $(CH_3)_3NH^+$, HCO_3^-, HPO_4^{2-}, etc.	751052

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.8	**Acrylamide, radical anion** — Continued							
27.8.3	**Boric acid**							
	$[CH_2CHCONH_2]^{\bullet-} + H_3BO_3 + H_2O \rightarrow CH_3\dot{C}HCONH_2 + B(OH)_4^-$	1.6×10^6	9.8	→0		p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.4	**Bicarbonate ion**							
	$[CH_2CHCONH_2]^{\bullet-} + HCO_3^- \rightarrow CH_3\dot{C}HCONH_2 + CO_3^{2-}$	8.6×10^5		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.5	**Ammonium ion**							
	$[CH_2CHCONH_2]^{\bullet-} + NH_4^+ \rightarrow CH_3\dot{C}HCONH_2 + NH_3$	9.5×10^6		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.6	**Dihydrogen phosphate ion**							
	$[CH_2CHCONH_2]^{\bullet-} + H_2PO_4^- \rightarrow CH_3\dot{C}HCONH_2 + HPO_4^{2-}$	3.8×10^6		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.7	**Hydrogen phosphate ion**							
	$[CH_2CHCONH_2]^{\bullet-} + HPO_4^{2-} \rightarrow CH_3\dot{C}HCONH_2 + PO_4^{3-}$	8.6×10^4		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.8	**Cyclohexylammonium ion**							
	$[CH_2CHCONH_2]^{\bullet-} + c\text{-}C_6H_{11}NH_3^+ \rightarrow CH_3\dot{C}HCONH_2 + c\text{-}C_6H_{11}NH_2$	1.4×10^7				p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.9	**Diethylammonium ion**							
	$[CH_2CHCONH_2]^{\bullet-} + (C_2H_5)_2NH_2^+ \rightarrow CH_3\dot{C}HCONH_2 + (C_2H_5)_2NH$	7.2×10^7				p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.10	**Ethylammonium ion**							
	$[CH_2CHCONH_2]^{\bullet-} + C_2H_5NH_3^+ \rightarrow CH_3\dot{C}HCONH_2 + C_2H_5NH_2$	1.5×10^7				p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.11	**Glycine**							
	$[CH_2CHCONH_2]^{\bullet-} + GlyH \rightarrow CH_3\dot{C}HCONH_2 + Gly^-$	2.5×10^7				p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.12	**Piperidine, conjugate acid**							
	$[CH_2CHCONH_2]^{\bullet-} + c\text{-}C_5H_{10}NH_2^+ \rightarrow CH_3\dot{C}HCONH_2 + c\text{-}C_5H_{10}NH$	6.3×10^7				p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.13	**Pyrrolidinium ion**							
	$[CH_2CHCONH_2]^{\bullet-} + {-}NH_2^+(CH_2)_4{-} \rightarrow CH_3\dot{C}HCONH_2 + {-}NH(CH_2)_4{-}$	2.0×10^8				p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.14	**Triethylammonium ion**							
	$[CH_2CHCONH_2]^{\bullet-} + (C_2H_5)_3NH^+ \rightarrow CH_3\dot{C}HCONH_2 + (C_2H_5)_3N$	1.3×10^8	10.3-11.8	→0		p.r.	D.k. in soln. contg. acrylamide.	751052
27.8.15	**Trimethylammonium ion**							
	$[CH_2CHCONH_2]^{\bullet-} + (CH_3)_3NH^+ \rightarrow CH_3\dot{C}HCONH_2 + (CH_3)_3N$	2.1×10^9		→0		p.r.	D.k. in soln. contg. acrylamide.	751052
27.9	**Acrylamide, radical anion, protonated**							
27.9.1	**Acrylamide**							
	$[CH_2\dot{C}HC(OH)NH_2]^+ + H_2C{=}CHCONH_2 \rightarrow$ addn.	2.5×10^5	~6			p.r.	D.k. at 275 nm.	700052
27.10	**Acrylic acid, radical anion**							
27.10.1	**Water**							
	$[CH_2CHCO_2H]^{\bullet-} + H_2O \rightarrow CH_3\dot{C}HCO_2^- + H_2O$	$4.0 \times 10^4\ s^{-1}$ $3.0 \times 10^4\ s^{-1}$	6.0 9.5			p.r.	D.k. in acrylate soln.; extrapolated to zero concn. of buffer.	761113
27.10.2	**Boric acid**							
	$[CH_2CHCO_2H]^{\bullet-} + H_3BO_3 \rightarrow CH_3\dot{C}HCO_2^- + H_3BO_3$	2.8×10^5	>7			p.r.	D.k. in soln. contg. acrylate.	761113

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.10	**Acrylic acid, radical anion** — Continued							
27.10.3	**Tetrahydroxyborate ion**							
	$[CH_2CHCO_2H]^{\bullet-} + B(OH)_4^- \rightarrow CH_3\dot{C}HCO_2^- + B(OH)_4^-$	2.3×10^5	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.4	**Ammonia**							
	$[CH_2CHCO_2H]^{\bullet-} + NH_3 \rightarrow CH_3\dot{C}HCO_2^- + NH_3$	2.8×10^6	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.5	**Ammonium ion**							
	$[CH_2CHCO_2H]^{\bullet-} + NH_4^+ \rightarrow CH_3\dot{C}HCO_2^- + NH_4^+$	1.8×10^6	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.6	**Hydroxide ion**							
	$[CH_2CHCO_2H]^{\bullet-} + OH^- \rightarrow$	7.7×10^8	>7	→0		p.r.	D.k. in soln. contg. acrylate; for mechanism and evidence for protonation at the β position see [740033].	761113
27.10.7	**Hydrogen phosphate ion**							
	$[CH_2CHCO_2H]^{\bullet-} + HPO_4^{2-} \rightarrow CH_3\dot{C}HCO_2^- + HPO_4^{2-}$	7×10^3	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.8	**Dihydrogen phosphate ion**							
	$[CH_2CHCO_2H]^{\bullet-} + H_2PO_4^- \rightarrow CH_3\dot{C}HCO_2^- + H_2PO_4$	5.7×10^6	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.10.9	**Hydrogen pyrophosphate ion**							
	$[CH_2CHCO_2H]^{\bullet-} + HP_2O_7^{3-} \rightarrow CH_3\dot{C}HCO_2^- + HP_2O_7^{3-}$	9.1×10^4	>7	→0		p.r.	D.k. in soln. contg. acrylate.	761113
27.11	**Alanine anhydride, radical anion**							
27.11.1	**Acetophenone**							
	[-NHCOCH(Me)NHCOCH(Me)-]$^{\bullet-}$ + $C_6H_5COCH_3$ → -CH(Me)CONHCH(Me)CONH- + $C_6H_5\dot{C}O^-CH_3$	2.0×10^9 1.5×10^9	5.2 12.2			p.r.	P.b.k. at 280 nm (320 at pH 12.2) in soln. contg. alanine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.11.2	**Benzophenone**							
	[-NHCOCH(Me)NHCOCH(Me)-]$^{\bullet-}$ + $(C_6H_5)_2CO$ → -CH(Me)CONHCH(Me)CONH- + $(C_6H_5)_2\dot{C}O^-$	1.6×10^9 1.9×10^9	5.2 12.2			p.r.	P.b.k. at 330 nm (320 at pH 12.2) in soln. contg. alanine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.11.3	**Cystamine**							
	[-NHCOCH(Me)NHCOCH(Me)-]$^{\bullet-}$ + $[H_2NCH_2CH_2S]_2$ → electron transfer	1.1×10^8	5.1, 11.4			p.r.	D.k. at 265 nm (R) in soln. contg. alanine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.11.4	**Cysteine**							
	[-NHCOCH(Me)NHCOCH(Me)-]$^{\bullet-}$ + CysSH → electron transfer	1.4×10^8	7.4			p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH and alanine anhydride.	710554
27.11.5	**2-Methyl-1,4-naphthoquinone**							
	[-NHCOCH(Me)NHCOCH(Me)-]$^{\bullet-}$ + 2-CH_3NQ → [2-CH_3NQ]$^{\bullet-}$ + other prod.	4.8×10^9	6.0			p.r.	P.b.k. at 395 nm in soln. contg. alanine anhydride; 92% *e*-transfer.	731047
27.12	**α-Aminoalkyl radical from glutathione**							
27.12.1	**α-Aminoalkyl radical from glutathione**							
	$^{\bullet}GSH + {}^{\bullet}GSH \rightarrow$	~1×10^7 ~4×10^6 ~2×10^6	7.5 9.0 10.5			p.r.	D.k. at 280 nm in N_2O-satd. soln. contg. (5-10) × 10^{-4} mol L^{-1} glutathione.	92A321
27.12.2	**Glutathione**							
	$^{\bullet}GSH + GSH \rightarrow GS^{\bullet} + GSH$	<1.4×10^5	7.5			p.r.	Estd. from formation rate of radical in soln. contg. 0.007 mol L^{-1} glutathione.	92A321

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.12	**α-Aminoalkyl radical from glutathione** — Continued							
	27.12.2 Glutathione — Continued							
		7.2×10^6 1.3×10^6	8.0 9.9			p.r.	P.b.k. at 410 nm in deaerated soln. contg. 0.03 mol L^{-1} glutathione.	89A096
	27.12.3 4-Nitroacetophenone							
	$^{\bullet}$GSH + PNAP → $[PNAP]^{\bullet-}$ + other prod.	7×10^8	8.4			p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} glutathione.	92A321
		8×10^9	10.5			p.r.	P.b.k. at 350 nm in N_2O-satad. soln. contg. 0.01 mol L^{-1} glutathione.	88A242
27.13	**α-Aminoalkyl radical from *S*-methylglutathione**							
	27.13.1 4-Nitroacetophenone							
	$^{\bullet}$GSMe + PNAP → $[PNAP]^{\bullet-}$ + other prod.	3.0×10^9	10.5			p.r.	P.b.k. at 350 nm in N_2O-satad. soln. contg. 0.01 mol L^{-1} *S*-methylglutathione.	88A242
27.14	**α-Aminoalkyl radical from ophthalmic acid (γ-glutamyl-2-aminobutanoylglycine)**							
	27.14.1 4-Nitroacetophenone							
	$^{\bullet}$GMe + PNAP → $[PNAP]^{\bullet-}$ + other prod.	1.8×10^9	10.5			p.r.	P.b.k. at 350 nm in N_2O-satad. soln. contg. 0.01 mol L^{-1} ophthalmic acid.	88A242
27.15	**2-Amino-1-(aminomethyl)ethyl, conjugate diacid**							
	27.15.1 2-Amino-1-(aminomethyl)ethyl, conjugate diacid							
	$^{\bullet}CH(CH_2NH_3^+)_2 + {}^{\bullet}CH(CH_2NH_3^+)_2$ →	5.5×10^8	2.3-3.5			p.r.	D.k. in N_2O-satd. soln. contg. 0.05-0.1 mol L^{-1} 1,3-propanediamine; $\varepsilon = 2100\ L\ mol^{-1}\ cm^{-1}$ at 355 nm.	93A473
	27.15.2 Copper(I) ion							
	$^{\bullet}CH(CH_2NH_3^+)_2 + Cu^+$ → $CuCH(CH_2NH_3^+)_2^+$	4.2×10^8	3.0-3.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.05-0.1 mol L^{-1} 1,3-propanediamine, 0-0.001 mol L^{-1} $CuSO_4$ and $(0.05\text{-}0.13) \times 10^{-3}$ mol L^{-1} Cu^+.	93A473
27.16	**1-Aminobutyl**							
	27.16.1 4-Nitroacetophenone							
	$CH_3CH_2CH_2\dot{C}HNH_2$ + PNAP → $CH_3CH_2CH_2CH{=}NH + H^+ + [PNAP]^{\bullet-}$	4.1×10^9	10.8			p.r.	P.b.k. at 350 nm and 545 nm in soln. contg. butylamine.	83A200
27.17	**Amino(carbamoyl)methyl**							
	27.17.1 2-Methyl-1,4-naphthoquinone							
	$NH_2\dot{C}HCONH_2$ + 2-CH_3NQ →	5.4×10^9	10.4			p.r.	P.b.k. at 395 nm in soln. contg. glycinamide; 41% *e*-transfer.	731047
		5×10^9	8.0			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycinamide; 38% *e*-transfer.	723057
27.18	**Ammonio(carbamoyl)methyl**							
	27.18.1 2-Methyl-1,4-naphthoquinone							
	$H_3N^+\dot{C}HCONH_2$ + 2-CH_3NQ →	3.6×10^9	3.2			p.r.	P.b.k. at 395 nm in soln. contg. glycinamide; 24% *e*-transfer.	731047
27.19	**2-Amino-1-carboxyethyl**							
	27.19.1 Copper(I) ion							
	$^{\bullet}CH(CH_2NH_3^+)CO_2^- + Cu^+$ → $CuCH(CH_2NH_3)CO_2^+$	3.4×10^9	2-7			p.r.	P.b.k. at 380 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} β-alanine, $(3.5\text{-}11) \times 10^{-5}$ mol L^{-1} Cu^+ and $(0\text{-}1) \times 10^{-3}$ mol L^{-1} Cu^{2+}.	92A134
27.20	**2-Amino-2-carboxyethyl**							
	27.20.1 Cysteine							
	$^{\bullet}CH_2CH(NH_3^+)CO_2^- + CysSH$ → $CysS^{\bullet} + Ala$	5.0×10^6 3.6×10^6	~6 ~9			p.r.	P.b.k. at 410 nm in deaerated soln. contg. 0.02 mol L^{-1} cysteine.	89A096

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.21	**2-Amino-2-carboxy-1-hydroxyethyl, anion**							
27.21.1	**First-order reaction**							
	$^{-}O\dot{C}HCH(NH_3^{+})CO_2^{-} \rightarrow NH_4^{+} + O{=}CHCHCO_2^{-}$	$2.4 \times 10^6\ s^{-1}$			290	p.r.	Condy. buildup in soln. contg. serine; pK of radical at the hydroxy site = 7.0.	85A462
27.21.2	**Ferricyanide ion**							
	$^{-}O\dot{C}HCH(NH_3^{+})CO_2^{-} + Fe(CN)_6^{3-} \rightarrow$	3.2×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} serine.	690522
27.21.3	**Oxygen**							
	$^{-}O\dot{C}HCH(NH_3^{+})CO_2^{-} + O_2 \rightarrow {}^{\cdot}OOCHOHCH(NH_2)CO_2^{-}$	2.4×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.3 mol L^{-1} serine and ferricyanide. rel. to $k(^{-}O\dot{C}HCH(NH_3^{+})CO_2^{-} + Fe(CN)_6^{3-}) = 3.2 \times 10^9$ L $mol^{-1}\ s^{-1}$.	690522
27.22	**2-Amino-2-carboxy-2-methylethyl**							
27.22.1	**Copper(I) ion**							
	$^{\cdot}CH_2C(CH_3)(NH_3^{+})CO_2^{-} + Cu^{+} \rightarrow CuCH_2C(CH_3)(NH_3)CO_2^{+}$	1.3×10^9	3			p.r.	P.b.k. at 355 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 2-methylalanine, (5-15) $\times 10^{-5}$ mol L^{-1} Cu^{+} and (3-100) $\times 10^{-3}$ mol L^{-1} Cu^{2+}.	92A215
27.22.2	***Copper(II) ion***							
	$^{\cdot}CH_2C(CH_3)(NH_3^{+})CO_2^{-} + Cu^{2+} \rightarrow CuCH_2C(CH_3)(NH_3)CO_2^{2+}$	1.3×10^7	3			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.05 mol L^{-1} 2-methylalanine and (3-100) $\times 10^{-3}$ mol L^{-1} Cu^{2+}.	92A215
27.22.3	**Pentacyanonitrosylferrate(II) ion**							
	$^{\cdot}CH_2C(CH_3)(NH_3^{+})CO_2^{-} + Fe(CN)_5NO^{3-} \rightarrow [Fe(CN)_5N(O)CH_2C(CH_3)(NH_3^{+})CO_2^{-}]^{3-}$	1.6×10^9	6.0-7.5			p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2-aminoisobutyrate ion and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
27.22.4	**Pentaamminenitrosylruthenium(II) ion**							
	$^{\cdot}CH_2C(CH_3)(NH_3^{+})CO_2^{-} + Ru(NH_3)_5NO^{2+} \rightarrow Ru(NH_3)_5N(O)CH_2C(CH_3)(NH_3)CO_2^{2+}$	3.1×10^9	6.0-7.5			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2-aminoisobutyrate ion and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
27.23	**1-Aminoethyl**							
27.23.1	**2-Methyl-1,4-naphthoquinone**							
	$CH_3\dot{C}HNH_2 + 2\text{-}CH_3NQ \rightarrow$	3.3×10^9	11.6			p.r.	P.b.k. at 395 nm in soln. contg. ethylamine; 34% e-transfer.	731047
27.24	**2-Aminoethyl, conjugate acid**							
27.24.1	**Copper(I) ion**							
	$^{\cdot}CH_2CH_2NH_3^{+} + Cu^{+} \rightarrow CuCH_2CH_2NH_3^{2+}$	1.1×10^9	2.2-3.8			p.r.	P.b.k. at 370 nm in N_2O-satd. soln. contg. 0.05-0.1 mol L^{-1} ethylamine, 0-0.001 mol L^{-1} $CuSO_4$ and (0.05-0.13) $\times 10^{-3}$ mol L^{-1} Cu^{+}.	93A473
27.25	**1-Amino-1-methylethyl**							
27.25.1	**2-Methyl-1,4-naphthoquinone**							
	$(CH_3)_2\dot{C}NH_2 + 2\text{-}CH_3NQ \rightarrow$	3.6×10^9	11.4			p.r.	P.b.k. at 395 nm in soln. contg. isopropylamine; 41% e-transfer; 14% e-transfer at pH 9.0.	731047
27.26	**2-Amino-1-hydroxyethyl conjugate monoacid**							
27.26.1	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$H_3N^{+}CH_2\dot{C}HOH +$ *N-rac*-Co(4,11-dieneN$_4$)$^{2+}$ →	4.0×10^7	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-aminoethanol; pH dependent.	78A200

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.27	**2-Amino-2-methylpropyl, conjugate acid**							
27.27.1	**Chromium(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2NH_3^+ + Cr^{2+} \rightarrow CrCH_2C(CH_3)_2NH_3^{3+}$	2.2×10^7	1-3			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.09 mol L^{-1} 2-methyl-2-propanamine and $(1\text{-}10) \times 10^{-4}$ mol L^{-1} Cr^{2+}.	92A073
		1.6×10^7	~3		293	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and 2-methyl-2-propanamine; $\Delta V‡ = 3.6\ cm^3\ mol^{-1}$, studied at 0.1-150 MPa.	92A361
27.27.2	**Copper(I) ion**							
	$^{\bullet}CH_2C(CH_3)_2NH_3^+ + Cu^+ \rightarrow CuCH_2C(CH_3)_2NH_3^{2+}$	1.2×10^9	3			p.r.	P.b.k. at 375 nm in N_2O-satd. soln. contg. 0.02-0.2 mol L^{-1} 2-methyl-2-propanamine, 0-0.0005 mol L^{-1} $CuSO_4$ and $(3.9\text{-}11) \times 10^{-5}$ mol L^{-1} Cu^+.	92A073
27.27.3	**Pentacyanonitrosylferrate(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2NH_3^+ + Fe(CN)_5NO^{3-} \rightarrow [Fe(CN)_5N(O)CH_2C(CH_3)_2NH_3]^{2-}$	1.2×10^{10}	6.0-7.5			p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2-methyl-2-propanamine and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
27.27.4	**Pentaamminenitrosylruthenium(II) ion**							
	$^{\bullet}CH_2C(CH_3)_2NH_3^+ + Ru(NH_3)_5NO^{2+} \rightarrow Ru(NH_3)_5N(O)CH_2C(CH_3)_2NH_3^{3+}$	2.0×10^9	6.0-7.5			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2-methyl-2-propanamine and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
27.28	**1-Amino-3-(methylthio)propyl**							
27.28.1	**Ferricyanide ion**							
	$CH_3SCH_2CH_2\dot{C}HNH_2 + Fe(CN)_6^{3-} \rightarrow$ electron transfer	3.5×10^9	5.8			p.r.	D.k. in N_2O-satd. soln. contg. methionine.	83A200
27.28.2	**Oxygen**							
	$CH_3SCH_2CH_2\dot{C}HNH_2 + O_2 \rightarrow O_2^{\bullet-} + CH_3SCH_2CH_2CH{=}NH + H^+$	1.8×10^9	5.5			p.r.	D.k. at 290 nm in N_2O-satd. soln. contg. methionine.	83A200
27.28.3	**4-Carboxybenzophenone, conjugate base**							
	$CH_3SCH_2CH_2\dot{C}HNH_2 + C_6H_5COC_6H_4\text{-}4\text{-}CO_2^- \rightarrow C_6H_5\dot{C}(OH)C_6H_4\text{-}4\text{-}CO_2^- + CH_3SCH_2CH_2CH{=}NH + 2\ H^+$	8.0×10^8	6			p.r.	P.b.k. at 570 nm in N_2O-satd. soln. contg. 4-carboxybenzophenone and methionine; pK_a of ketyl radical = 8.2 [81A314], pK_a of aminoalkyl radical = 3.85.	92A427
27.28.4	**Cysteine**							
	$CH_3SCH_2CH_2\dot{C}HNH_2 + CysSH \rightarrow CH_3SCH_2CH_2CH{=}NH + H^+ + CysS^{\bullet}$	2.7×10^8	8.2			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} methionine and 5×10^{-4} mol L^{-1} cysteine.	89A096
		$\sim 1 \times 10^9$	8.3			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} methionine.	83A200
27.28.5	**L-Cystinylbisglycine**							
	$CH_3SCH_2CH_2\dot{C}HNH_2 + (CysGly)_2 \rightarrow CH_3SCH_2CH_2CH{=}NH + (CysGly)_2^{\bullet-} + H^+$	$>7 \times 10^6$	8.1			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} methionine and $(CysGly)_2$.	89A096
27.28.6	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$CH_3SCH_2CH_2\dot{C}HNH_2 + MV^{2+} \rightarrow MV^{\bullet+} + CH_3SCH_2CH_2CH{=}NH + 2\ H^+$	3.6×10^9	7			p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. 5×10^{-3} mol L^{-1} methionine.	81A124 83A200
27.28.7	**1,2-Dithiolane-3-pentanoate ion (Lipoate ion)**							
	$CH_3SCH_2CH_2\dot{C}HNH_2 + RSSR \rightarrow$ electron transfer	$\sim 1 \times 10^8$	8.2			p.r.	D.k. in N_2O-satd. soln. contg. methionine.	83A200
27.28.8	**Nicotinamide adenine dinucleotide**							
	$CH_3SCH_2CH_2\dot{C}HNH_2 + NAD^+ \rightarrow CH_3SCH_2CH_2CH{=}NH + H^+ + NAD^{\bullet}$	8.5×10^8	6.6			p.r.	D.k. in N_2O-satd. soln. contg. methionine.	83A200

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.28	**1-Amino-3-(methylthio)propyl** — Continued							
27.28.9	**4-Nitroacetophenone**							
	$CH_3SCH_2CH_2\dot{C}HNH_2$ + PNAP → $[PNAP]^{\cdot-}$ + $CH_3SCH_2CH_2CH{=}NH$ + H^+	3.9×10^9	4.3-11			p.r.	P.b.k. at 350 or 545 nm in N_2O-satd. soln. contg. 5×10^{-3} mol L^{-1} methionine and 2×10^{-5} mol L^{-1} PNAP.	83A200
27.28.10	**2,2,6,6-Tetramethylpiperidine-*N*-oxyl**							
	$CH_3SCH_2CH_2\dot{C}HNH_2$ + TMPN →	5.4×10^8	7			p.r.	Condy. changes in N_2O-satd. soln. contg. methionine.	83A200
27.28.11	**Tetranitromethane**							
	$CH_3SCH_2CH_2\dot{C}HNH_2$ + $C(NO_2)_4$ → electron transfer	4.2×10^9	4.5			p.r.	D.k. in N_2O-satd. soln. contg. methionine.	83A200
27.28.12	**Cytochrome C**							
	$CH_3SCH_2CH_2\dot{C}HNH_2$ + Cyt C (Fe^{3+}) → electron transfer	6.6×10^8	5.0			p.r.	D.k. in N_2O-satd. soln. contg. methionine.	83A200
27.29	**1-Amino-3-(methylthio)propyl, conjugate acid**							
27.29.1	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$CH_3SCH_2CH_2\dot{C}HNH_3^+$ + MV^{2+} → $MV^{\cdot+}$ + $CH_3SCH_2CH_2CH{=}NH$ + 2 H^+	1.0×10^7	<3			p.r.	P.b.k. at 600 nm; calcd. from studies over a pH range in N_2O satd. soln. contg. 5×10^{-3} mol L^{-1} methionine; pK_a of radical = 3.85.	83A200
27.29.2	**2,2,6,6-Tetramethylpiperidine-*N*-oxyl**							
	$CH_3SCH_2CH_2\dot{C}HNH_3^+$ + TMPN →	2.3×10^8	<3			p.r.	Condy. changes in N_2O-satd. soln. contg. methionine.	83A200
27.30	**2-Ammonio-1-phosphatoethyl**							
27.30.1	**Nifuroxime**							
	$H_3^+NCH_2\dot{C}HOPO_3^{2-}$ + NF →	3.0×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} *o*-phosphorylethanolamine; 1% *e*-transfer.	731099
27.31	**Carbamoyl**							
27.31.1	**Hexaamminecobalt(III) ion**							
	$^{\cdot}CONH_2$ + $Co(NH_3)_6^{3+}$ →	$<3.6 \times 10^7$	6.2			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} formamide.	72A018
27.31.2	**Chromium(II) ion**							
	$^{\cdot}CONH_2$ + Cr^{2+} → $CrCONH_2^{2+}$	6.5×10^8	~5			p.r.	P.b.k. in Ar- or N_2O-satd. soln. contg. formamide.	741146
27.31.3	**Hexaammineruthenium(III) ion**							
	$^{\cdot}CONH_2$ + $Ru(NH_3)_6^{3+}$ →	$<7.0 \times 10^7$	6.2			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} formamide; *e*-transfer.	72A018
27.31.4	***aci*-Nitromethane anion**							
	$^{\cdot}CONH_2$ + $CH_2NO_2^-$ → adduct formation	2.4×10^8	9.15		~285	p.r.	D.k. (esr) in N_2O-satd. soln. contg. (0.5-5) × 10^{-3} mol L^{-1} nitromethane and 0.1 mol L^{-1} formamide.	88D069
27.32	**1-Carbamoyl-1-hydroxyethyl**							
27.32.1	**Tetrahydroxyborate ion**							
	$CH_3\dot{C}OHCONH_2$ + $B(OH)_4^-$ → $^{\cdot}CO^-(CH_3)CONH_2$ + H_3BO_3 + H_2O	3.1×10^8	8.3	→0		p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. lactamide.	751053
27.32.2	**Ammonia**							
	$CH_3\dot{C}OHCONH_2$ + NH_3 → $^{\cdot}CO^-(CH_3)CONH_2$ + NH_4^+	9.7×10^8	8.05	→0		p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. lactamide.	751053
27.32.3	**Hydroxide ion**							
	$CH_3\dot{C}OHCONH_2$ + OH^- → $^{\cdot}CO^-(CH_3)CONH_2$ + H_2O	1.1×10^{10}	8.0-10.2	→0		p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. lactamide.	751053

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.32	**1-Carbamoyl-1-hydroxyethyl** — Continued							
	27.32.4 Hydrogen phosphate ion							
	$CH_3\dot{C}OHCONH_2 + HPO_4^{2-} \rightarrow$ $^{\bullet}CO^{-}(CH_3)CONH_2 + H_2PO_4^{-}$	8.5×10^8	6.2	→0		p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. lactamide.	751053
	27.32.5 Hydrogen pyrophosphate ion							
	$CH_3\dot{C}OHCONH_2 + HP_2O_7^{3-} \rightarrow$ $^{\bullet}CO^{-}(CH_3)CONH_2 + H_2P_2O_7^{2-}$	3.7×10^8	8.1, 9.3			p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. lactamide; $k = 8.5 \times 10^8$ $L\ mol^{-1}\ s^{-1}$ for $P_2O_7^{4-}$.	751053
	27.32.6 1,4-Benzoquinone							
	$CH_3\dot{C}OHCONH_2 + Q \rightarrow Q^{\bullet-}$ + other prod.	2.0×10^9 3.6×10^9	5.0 7.3			p.r.	P.b.k. in N_2O-satd. soln. contg. lactamide.	731052
27.33	**(Carbamoyl)hydroxymethyl**							
	27.33.1 Tetrahydroxyborate ion							
	$^{\bullet}CHOHCONH_2 + B(OH)_4^{-} \rightarrow$ $\dot{C}HO^{-}CONH_2 + H_3BO_3 + H_2O$	9.1×10^8	8.25	→0		p.r.	D.k. at 290 nm in N_2O-satd. soln. contg. glycolamide.	751053
	27.33.2 Ammonia							
	$^{\bullet}CHOHCONH_2 + NH_3 \rightarrow$ $\dot{C}HO^{-}CONH_2 + NH_4^{+}$	1.2×10^9	8.05, 8.25	→0		p.r.	D.k. at 290 nm in N_2O-satd. soln. contg. glycolamide.	751053
	27.33.3 Hydroxide ion							
	$^{\bullet}CHOHCONH_2 + OH^{-} \rightarrow$ $\dot{C}HO^{-}CONH_2 + H_2O$	1.1×10^{10}	8.3-9.9	→0		p.r.	D.k. at 290 nm in N_2O-satd. soln. contg. glycolamide.	751053
	27.33.4 Hydrogen phosphate ion							
	$^{\bullet}CHOHCONH_2 + HPO_4^{2-} \rightarrow$ $\dot{C}HO^{-}CONH_2 + H_2PO_4^{-}$	1.8×10^9	8.3	→0		p.r.	D.k. at 290 nm in N_2O-satd. soln. contg. glycolamide.	751053
	27.33.5 Hydrogen pyrophosphate ion							
	$^{\bullet}CHOHCONH_2 + HP_2O_7^{3-} \rightarrow$ $\dot{C}HO^{-}CONH_2 + H_2P_2O_7^{2-}$	1.1×10^9	6.1, 6.4	→0		p.r.	D.k. at 290 nm in N_2O-satd. soln. contg. glycolamide.	751053
27.34	**Carbamoyl(hydroxy)methyl, anion**							
	27.34.1 2-Methyl-1,4-naphthoquinone							
	$\dot{C}HO^{-}CONH_2$ + 2-CH_3NQ →	2.3×10^9	7.1			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycolamide; 48% e-transfer.	731047
27.35	**Carboxy(carboxymethylamino)methyl, dianion**							
	27.35.1 Ferricyanide ion							
	$^{-}O_2CCH_2NH\dot{C}HCO_2^{-} + Fe(CN)_6^{3-} \rightarrow$	5.0×10^8	7			p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. iminodiacetate ion.	81A023
	27.35.2 Oxygen							
	$^{-}O_2CCH_2NH\dot{C}HCO_2^{-} + O_2 \rightarrow$ $^{-}O_2CCH_2NHCH(OO^{\bullet})CO_2^{-}$	8×10^8	7			p.r.	D.k. at 270 nm in N_2O/O_2-satd. soln. contg. iminodiacetate ion.	81A023
27.36	**1-Carboxyethenyl, anion**							
	27.36.1 Acetylenecarboxylate ion							
	$H_2C{=}\dot{C}CO_2^{-} + HC{\equiv}CCO_2^{-} \rightarrow$ $H_2C{=}C(CO_2^{-})CH{=}\dot{C}CO_2^{-}$	4.2×10^6	11			p.r.	D.k. (esr) in N_2-satd. soln. contg. 0.002 mol L^{-1} acetylenecarboxylate ion.	82D088
27.37	**1-Carboxyethyl**							
	27.37.1 1-Carboxyethyl							
	$CH_3\dot{C}HCO_2H + CH_3\dot{C}HCO_2H \rightarrow$	1.1×10^9	3			p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. propionic acid; $\varepsilon = 700$ $L\ mol^{-1}\ cm^{-1}$; $pK_a = 4.9$.	690446
	27.37.2 Chromium(II) ion							
	$CH_3\dot{C}HCO_2H + Cr^{2+} \rightarrow$ $CrCH(CH_3)CO_2H^{2+}$	1.1×10^8	~1			p.r.	P.b.k. in Ar-satd. soln. contg. propionic acid and $HClO_4$.	741146

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.37	**1-Carboxyethyl** — Continued							
27.37.3	**Uranium(III) ion**							
	$CH_3\dot{C}HCO_2H + U^{3+} \rightarrow UCH(CH_3)CO_2H^{3+}$	2.1×10^7	0.3			p.r.	D.k. sy 350 nm in He-satd. soln. contg. 0.5 mol L^{-1} $HClO_4$ and 0.1-1 mol L^{-1} propionic acid.	85A122
27.37.4	**Acrylic acid**							
	$CH_3\dot{C}HCO_2H + H_2C{=}CHCO_2H \rightarrow$ addn.	3×10^5	~2			chem	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and propionic acid; used $2k(R + R) = 2.2 \times 10^9$ L $mol^{-1}\ s^{-1}$.	93D265
27.37.5	**Methacrylic acid**							
	$CH_3\dot{C}HCO_2H + H_2C{=}C(CH_3)CO_2H \rightarrow$ addn.	5×10^5	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and propionic acid; used $2k(R + R) = 2.2 \times 10^9$ L $mol^{-1}\ s^{-1}$.	93D265
27.38	**1-Carboxyethyl, anion**							
27.38.1	**1-Carboxyethyl, anion**							
	$CH_3\dot{C}HCO_2^- + CH_3\dot{C}HCO_2^- \rightarrow$	6×10^8	10, 13.5			p.r.	D.k. at 335 nm in N_2O-satd. soln. contg. propionate ion; $\varepsilon = 950$ L mol^{-1} cm^{-1}; $pK_a = 4.9$.	690446
27.38.2	**Copper(II) ion**							
	$CH_3\dot{C}HCO_2^- + Cu^{2+} \rightarrow CuCH(CH_3)CO_2^+$	5×10^8	6			p.r.	P.b.k. in N_2O-satd. soln. contg. $(2\text{-}10) \times 10^{-5}$ mol L^{-1} $CuSO_4$ and 0.01 mol L^{-1} propionate ion.	80A277
27.38.3	**Nifuroxime**							
	$CH_3\dot{C}HCO_2^- + NF \rightarrow$	4.0×10^9	7			p.r.	P.b.k. at 390 nm (NF^-) in N_2O-satd. soln. contg. 0.2 mol L^{-1} propionate ion; 2% e-transfer based on abs. spectra.	731099
27.39	**2-Carboxyethyl**							
27.39.1	**Acrylic acid**							
	$^{\cdot}CH_2CH_2CO_2H + H_2C{=}CHCO_2H \rightarrow$ addn.	3.0×10^6	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and propionic acid; used $2k(R + R) = 2.1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	93D265
27.39.2	**Methacrylic acid**							
	$^{\cdot}CH_2CH_2CO_2H + H_2C{=}C(CH_3)CO_2H \rightarrow$ addn.	3.5×10^6	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and propionic acid; used $2k(R + R) = 2.1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	93D265
27.40	**1-Carboxy-2-hydroxyethyl, anion**							
27.40.1	**Acrylate ion**							
	$HOCH_2\dot{C}HCO_2^- + CH_2{=}CHCO_2^- \rightarrow HOCH_2CH(CO_2^-)CH_2\dot{C}HCO_2^-$	7×10^4	12	0.1-0.5		p.r.	D.k. (esr) in N_2-satd. soln. contg. acrylate ion.	82A328
27.40.2	**Nifuroxime**							
	$HOCH_2\dot{C}HCO_2^- + NF \rightarrow$	6×10^9	7			p.r.	P.b.k. at 390 nm in soln. contg. 4×10^{-4} mol L^{-1} acrylate ion; 65% e-transfer.	731099
27.41	**2-Carboxy-1-hydroxy-1-methylethyl, dianion**							
27.41.1	**Ferricyanide ion**							
	$CH_3\dot{C}(O^-)CH_2CO_2^- + Fe(CN)_6^{3-} \rightarrow$	7.3×10^8	7.0			p.r.	D.k. at 420 nm in soln. contg. acetoacetate ion (radical by reaction with e_{aq}^-).	731104
27.41.2	**Permanganate ion**							
	$CH_3\dot{C}(O^-)CH_2CO_2^- + MnO_4^- \rightarrow$	4.8×10^9	9.2			p.r.	D.k. at 545 nm in Ar-satd. soln. contg. acetoacetate and *tert*-BuOH.	731104

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.41	**2-Carboxy-1-hydroxy-1-methylethyl, dianion** — Continued							
	27.41.3 9,10-Anthraquinone							
	$CH_3\dot{C}(O^-)CH_2CO_2^- + AQ \rightarrow [AQ]^{\cdot-} + CH_3COCH_2CO_2^-$	6.7×10^8	9.2			p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. acetoacetate and 1 mol L^{-1} *tert*-BuOH.	731104
	27.41.4 9,10-Anthraquinone-2,6-disulfonate ion							
	$CH_3\dot{C}(O^-)CH_2CO_2^- + 2,6\text{-}diSO_3AQ^{2-} \rightarrow [2,6\text{-}diSO_3AQ]^{\cdot 3-} + CH_3COCH_2CO_2^-$	7.2×10^8	9.2			p.r.	P.b.k. at 400 nm. in Ar-satd. soln. contg. acetoacetate and *tert*-BuOH.	731104
	27.41.5 9,10-Anthraquinone-2-sulfonate ion							
	$CH_3\dot{C}(O^-)CH_2CO_2^- + 2\text{-}SO_3AQ^- \rightarrow [2\text{-}SO_3AQ]^{\cdot 2-} + CH_3COCH_2CO_2^-$	2.1×10^9	9.2			p.r.	P.b.k. at 400 nm. in Ar-satd. soln. contg. acetoacetate and *tert*-BuOH.	731104
	27.41.6 2,5-Dimethyl-1,4-benzoquinone							
	$CH_3\dot{C}(O^-)CH_2CO_2^- + 2,5\text{-}(CH_3)_2Q \rightarrow 2,5\text{-}(CH_3)_2Q^{\cdot-} + CH_3COCH_2CO_2^-$	3.3×10^9	9.2			p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. *tert*-BuOH + acetoacetate ion.	731104
	27.41.7 2-Hydroxy-1,4-naphthoquinone							
	$CH_3\dot{C}(O^-)CH_2CO_2^- + 2\text{-}(OH)NQ \rightarrow 2\text{-}(OH)NQ^{\cdot-} + CH_3COCH_2CO_2^-$	1.5×10^9	9.2			p.r.	P.b.k. at 400 nm in Ar-satd. soln. contg. acetoacetate ion and *tert*-BuOH.	731104
	27.41.8 2-Methyl-1,4-naphthoquinone							
	$CH_3\dot{C}(O^-)CH_2CO_2^- + 2\text{-}CH_3NQ \rightarrow [2\text{-}CH_3NQ]^{\cdot-} + CH_3COCH_2CO_2^-$	3.7×10^9	9.2			p.r.	P.b.k. at 395 nm in soln. contg. acetoacetate and 1 mol L^{-1} *tert*-BuOH; 95% *e*-transfer.	731047 731104
27.42	**2-Carboxy-2-hydroxy-2-methylethyl, anion**							
	27.42.1 Pentacyanonitrosylferrate(II) ion							
	$^{\cdot}CH_2C(CH_3)(OH)CO_2^- + Fe(CN)_5NO^{3-} \rightarrow [Fe(CN)_5N(O)CH_2COH(CH_3)CO_2]^{4-}$	6.3×10^8	6.0-7.5			p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2-hydroxyisobutyrate ion and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
	27.42.2 Pentaamminenitrosylruthenium(II) ion							
	$^{\cdot}CH_2C(CH_3)(OH)CO_2^- + Ru(NH_3)_5NO^{2+} \rightarrow Ru(NH_3)_5N(O)CH_2C(CH_3)(OH)CO_2^+$	3.0×10^9	6.0-7.5			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L^{-1} 2-hydroxyisobutyrate ion and 4×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
27.43	**1-Carboxy-2-hydroxypropyl, anion**							
	27.43.1 Nifuroxime							
	$CH_3CHOH\dot{C}HCO_2^- + NF \rightarrow$	5.5×10^9	7			p.r.	P.b.k. at 390 nm in soln. contg. crotonate ion; 25% *e*-transfer.	731099
27.44	**Carboxy(methylamino)methyl, anion**							
	27.44.1 2-Methyl-1,4-naphthoquinone							
	$CH_3NH\dot{C}HCO_2^- + 2\text{-}CH_3NQ \rightarrow$	1.1×10^9	6.0			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. sarcosine; 33% *e*-transfer.	731047
		1.7×10^9	12.5			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. sarcosine; 64% *e*-transfer.	731047
27.45	**1-Carboxy-1-methylethy¹**							
	27.45.1 1-Carboxy-1-methylethyl							
	$^{\cdot}C(CH_3)_2CO_2H + {}^{\cdot}C(CH_3)_2CO_2H \rightarrow$	$\sim 5 \times 10^8$	3			p.r.	D.k. in N_2O-satd. soln. contg. isobutyric acid; $pK_a = 5.8$.	690446
	27.45.2 Chromium(II) ion							
	$^{\cdot}C(CH_3)_2CO_2H + Cr^{2+} \rightarrow CrC(CH_3)_2CO_2H^{2+}$	1.2×10^8	1.0-2.0		295	p.r.	P.b.k. at 290 nm in N_2O-satd. soln. contg. $(2\text{-}10) \times 10^{-4}$ mol L^{-1} Cr^{2+} and 0.1 mol L^{-1} isobutyric acid; $^{\cdot}CH_2CH(CH_3)CO_2H$ also contributes to this reaction.	82A315

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.45	**1-Carboxy-1-methylethyl** — Continued							
27.45.3	**Tris(1,10-phenanthroline)iron(III) ion**							
	$^{\cdot}C(CH_3)_2CO_2H + Fe(phen)_3^{3+} \rightarrow$ redn.	6.3×10^7	~1			p.r.	P.b.k. at 490 nm in soln. contg. isobutyric acid; also includes reaction of $^{\cdot}CH_2CH(CH_3)CO_2H$.	85A284
27.45.4	**Acrylic acid**							
	$^{\cdot}C(CH_3)_2CO_2H + H_2C{=}CHCO_2H \rightarrow$ addn.	5×10^5	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and isobutyric acid; estimated from an assumed $2k$(R + R).	93D265
27.45.5	**Methacrylic acid**							
	$^{\cdot}C(CH_3)_2CO_2H + H_2C{=}C(CH_3)CO_2H \rightarrow$ addn.	7×10^5	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and isobutyric acid; estimated from an assumed $2k$(R + R).	93D265
27.46	**1-Carboxy-1-methylethyl, anion**							
27.46.1	**1-Carboxy-1-methylethyl, anion**							
	$(CH_3)_2\dot{C}CO_2^- + (CH_3)_2\dot{C}CO_2^- \rightarrow$	$\sim 5 \times 10^8$	9			p.r.	D.k. in N_2O-satd. soln. contg. isobutyric acid; $pK_a = 5.8$.	690446
27.47	**2-Carboxy-2-methylpropyl**							
27.47.1	**2-Carboxy-2-methylpropyl**							
	$^{\cdot}CH_2C(CH_3)_2CO_2H +$ $^{\cdot}CH_2C(CH_3)_2CO_2H \rightarrow$ $HO_2CC(CH_3)_2CH_2CH_2C(CH_3)_2CO_2H$	7×10^8				p.r.	D.k. at 245 nm in N_2O-satd. soln. contg. pivalic acid; studied at pH 2.2-8.3; $pK_a = 4.9$.	94A494
		6.5×10^8	3			p.r.	D.k. in N_2O-satd. soln. contg. pivalic acid; $pK_a = 4.8$.	690446
27.47.2	**2-Carboxy-2-methylpropyl, anion**							
	$^{\cdot}CH_2C(CH_3)_2CO_2H +$ $^{\cdot}CH_2C(CH_3)_2CO_2^- \rightarrow$ $HO_2CC(CH_3)_2CH_2CH_2C(CH_3)_2CO_2^-$	$\sim 7 \times 10^8$				p.r.	D.k. at 245 nm in N_2O-satd. soln. contg. pivalic acid; studied at pH 2.2-8.3; $pK_a = 4.9$.	94A494
27.47.3	**Chromium(II) ion**							
	$^{\cdot}CH_2C(CH_3)_2CO_2H + Cr^{2+} \rightarrow$ $CrCH_2C(CH_3)_2CO_2H^{2+}$	1.1×10^8	~ 1			p.r.	P.b.k. in Ar-satd. soln. contg. pivalic acid and $HClO_4$.	741146
27.47.4	**Copper(I) ion**							
	$^{\cdot}CH_2C(CH_3)_2CO_2H + Cu^+ \rightarrow$ $CuCH_2C(CH_3)_2CO_2H^+$	2.4×10^9	1.0-3.5			p.r.	P.b.k. in N_2O-satd. soln. contg. $(5\text{-}30) \times 10^{-4}$ mol L^{-1} $CuSO_4$, $(5\text{-}30) \times 10^{-5}$ mol L^{-1} Cu^+ and 0.05-0.1 mol L^{-1} pivalic acid.	90A474
27.47.5	**Copper(II) ion**							
	$^{\cdot}CH_2C(CH_3)_2CO_2H + Cu^{2+} \rightarrow$ $CuCH_2C(CH_3)_2CO_2H^{2+}$	3.1×10^7	3-4			p.r.	P.b.k. in N_2O-satd. soln. contg. $(5\text{-}20) \times 10^{-4}$ mol L^{-1} $CuSO_4$ and 0.05-0.1 mol L^{-1} pivalic acid.	90A474
27.47.6	**Tris(1,10-phenanthroline)iron(III) ion**							
	$^{\cdot}CH_2C(CH_3)_2CO_2H + Fe(phen)_3^{3+} \rightarrow$ redn.	7.2×10^7	~1			p.r.	P.b.k. at 490 nm in soln. contg. pivalic acid.	85A284
27.48	**2-Carboxy-2-methylpropyl, anion**							
27.48.1	**2-Carboxy-2-methylpropyl, anion**							
	$^{\cdot}CH_2C(CH_3)_2CO_2^- +$ $^{\cdot}CH_2C(CH_3)_2CO_2^- \rightarrow$ $^-O_2CC(CH_3)_2CH_2CH_2C(CH_3)_2CO_2^-$	3.7×10^8				p.r.	D.k. at 245 nm in N_2O-satd. soln. contg. pivalic acid; studied at pH 2.2-8.3; $pK_a = 4.9$.	94A494
		4.7×10^8	9			p.r.	D.k. at 240 nm in N_2O-satd. soln. contg. pivalate ion; $\epsilon = 1800$ L mol^{-1} cm^{-1}.	690446

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.48	**2-Carboxy-2-methylpropyl, anion** — Continued							
	27.48.2 Pentacyanonitrosylferrate(II) ion							
	$^{\bullet}CH_2C(CH_3)_2CO_2^- + Fe(CN)_5NO^{3-} \rightarrow [Fe(CN)_5N(O)CH_2C(CH_3)_2CO_2]^{4-}$	2.0×10^9	6.0-7.5			p.r.	D.k. at 380 nm as well as p.b.k. in soln. contg. 0.3 mol L^{-1} pivalate ion and 5×10^{-4} mol L^{-1} $Fe(CN)_5NO^{2-}$.	79A134
	27.48.3 Pentaamminenitrosylruthenium(II) ion							
	$^{\bullet}CH_2C(CH_3)_2CO_2^- + Ru(NH_3)_5NO^{2+} \rightarrow Ru(NH_3)_5N(O)CH_2C(CH_3)_2CO_2^+$	2.9×10^9	6.0-7.5			p.r.	D.k. at 280 nm, as well as p.b.k. in soln. contg. 0.3 mol L^{-1} pivalate ion and 5×10^{-4} mol L^{-1} $Ru(NH_3)_5NO^{3+}$.	79A134
27.49	**2-Carboxy-5-oxopyrrolidinyl, conjugate base**							
	27.49.1 Hydroxide ion							
	$-(CH_2)_2CONH\dot{C}(CO_2^-)- + OH^- \rightarrow -(CH_2)_2CON^-\dot{C}(CO_2^-)- + H_2O$	1×10^9				*e*-r.	Estd. by esr from pH dependence of line width in N_2O-satd. soln. contg. 2-pyrrolidone-5-carboxylic acid; ($pK_a = 12.7$).	775087
27.50	**1-Carboxypropyl**							
	27.50.1 1-Carboxypropyl							
	$CH_3CH_2\dot{C}HCO_2H + CH_3CH_2\dot{C}HCO_2H \rightarrow$	$\sim 5 \times 10^8$	3			p.r.	D.k. in N_2O-satd. soln. contg. butyric acid; $pK_a = 4.8$.	690446
27.51	**1-Carboxypropyl, anion**							
	27.51.1 1-Carboxypropyl, anion							
	$CH_3CH_2\dot{C}HCO_2^- + CH_3CH_2\dot{C}HCO_2^- \rightarrow$	$\sim 5 \times 10^8$	9			p.r.	D.k. at 335 nm in N_2O-satd. soln. contg. butyrate ion; $\varepsilon = 900\ L\ mol^{-1}\ cm^{-1}$.	690446
	27.51.2 Nifuroxime							
	$CH_3CH_2\dot{C}HCO_2^- + NF \rightarrow$	4.9×10^9	7			p.r.	P.b.k. at 390 nm (NF^-) in N_2O-satd. soln. contg. 0.2 mol L^{-1} butyrate ion; 2% *e*-transfer.	731099
27.52	**2-Carboxypropyl**							
	27.52.1 Acrylic acid							
	$^{\bullet}CH_2CH(CH_3)CO_2H + H_2C{=}CHCO_2H \rightarrow$ addn.	2.5×10^6	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and isobutyric acid; used $2k(R + R) = 1.4 \times 10^9$ L $mol^{-1}\ s^{-1}$.	93D265
	27.52.2 Methacrylic acid							
	$^{\bullet}CH_2CH(CH_3)CO_2H + H_2C{=}C(CH_3)CO_2H \rightarrow$ addn.	2.5×10^6	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and isobutyric acid; used $2k(R + R) = 1.4 \times 10^9$ L $mol^{-1}\ s^{-1}$.	93D265
27.53	**1-Chloro-2,2-difluoro-2-methoxyethyl**							
	27.53.1 Oxygen							
	$CH_3OCF_2\dot{C}HCl + O_2 \rightarrow CH_3OCF_2CHClOO^{\bullet}$	1.3×10^9				p.r.	Eval. from leveling off of rate of reaction of peroxyl radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L^{-1} *tert*-BuOH and methoxyflurane.	88A364
27.54	**1-Chloro-2-oxoethyl**							
	27.54.1 1-Chloro-2-oxoethyl							
	$^{\bullet}CHClCHO + {}^{\bullet}CHClCHO \rightarrow$	2.6×10^8				p.r.	D.k. at 265 nm in N_2O-satd. soln. contg. 10^{-4} mol L^{-1} *trans*-1,2-dichloroethylene; $\varepsilon = 800$ L $mol^{-1}\ s^{-1}$ (from graph).	710709

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.55	**2-(Chloromethylene)-1,3-dioxolane radical cation**							
27.55.1	**Hydroxide ion**							
	$[\text{-}(CH_2)_2OC(=CHCl)O\text{-}]^{\bullet+} + OH^- \rightarrow {}^{\bullet}CH_2CH_2OH$ + other prod.	1.2×10^9	≤5			p.r.	Condy. changes; radical from 2-(dichloromethyl)-1,3-dioxolane.	81D027
27.56	**Crotonamide, radical anion**							
27.56.1	**Water**							
	$[CH_3CHCHCONH_2]^{\bullet-} + H_2O \rightarrow CH_3CH_2\dot{C}HCONH_2 + OH^-$	$2 \times 10^4\ s^{-1}$	10.2			p.r.	D.k. in soln. contg. *trans*-crotonamide and borate buffer.	751052
27.57	**Crotonic acid, radical anion**							
27.57.1	**Water**							
	$[CH_3CHCHCO_2H]^{\bullet-} + H_2O \rightarrow CH_3CH_2\dot{C}HCO_2^- + H_2O$	$1.0 \times 10^4\ s^{-1}$	10.4			p.r.	D.k. in soln. contg. crotonate; extrapolated to zero concn. of buffer.	761113
27.57.2	**Hydroxide ion**							
	$[CH_3CHCHCO_2H]^{\bullet-} + OH^- \rightarrow CH_3CH_2\dot{C}HCO_2^- + OH^-$	$\sim 1.2 \times 10^8$	>7.5	→0		p.r.	D.k. in soln. contg. *trans*-crotonate.	761113
27.58	**18-Crown-6 radical**							
27.58.1	**18-Crown-6 radical**							
	$C_{12}H_{23}O_6 + C_{12}H_{23}O_6 \rightarrow$	2×10^8	6.7			p.r.	D.k. at 260 nm; radical by H-abstr. with $^{\bullet}OH$; similar results at pH 1.2 with $H^{\bullet}$, also studied at pH 13.6.	87A299
27.59	**1-Cyanoethyl**							
27.59.1	**Chromium(II) ion**							
	$CH_3\dot{C}HCN + Cr^{2+} \rightarrow CrCH(CH_3)CN^{2+}$	2.3×10^8	1.0-2.0		295	p.r.	P.b.k. at 290 nm in N_2O-satd. soln. contg. $(2\text{-}10) \times 10^{-4}$ mol L^{-1} Cr^{2+} and 0.2 mol L^{-1} propionitrile; ${}^{\bullet}CH_2CH_2CN$ also contributes to this reaction.	82A315
27.60	**Cyanomethyl**							
27.60.1	**Oxygen**							
	${}^{\bullet}CH_2CN + O_2 \rightarrow NCCH_2OO^{\bullet}$	1.3×10^9				p.r.	P.b.k. in N_2O/O_2 (4:1) satd. soln. contg. 5% acetonitrile.	90A371
27.61	**1-Cyano-1-methylethyl**							
27.61.1	**Chromium(II) ion**							
	${}^{\bullet}C(CH_3)_2CN + Cr^{2+} \rightarrow CrC(CH_3)_2CN^{2+}$	1.9×10^8	1.0-2.0		295	p.r.	P.b.k. at 290 nm in N_2O-satd. soln. contg. $(2\text{-}10) \times 10^{-4}$ mol L^{-1} Cr^{2+} and 0.1 mol L^{-1} isobutyronitrile; ${}^{\bullet}CH_2CH(CH_3)CN$ also contributes to this reaction.	82A315
27.62	**(Cyclohexyl)hydroxymethyl**							
27.62.1	**Biacetyl**							
	$c\text{-}C_6H_{11}\dot{C}HOH + CH_3COCOCH_3 \rightarrow c\text{-}C_6H_{11}CHO + H^+ + [CH_3COCOCH_3]^{\bullet-}$	2.6×10^8				p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. cyclohexanemethanol.	680249
27.63	**Diamide, radical anion**							
27.63.1	**Hydrogen phosphate ion**							
	$[(CH_3)_2NCONNCON(CH_3)_2]^{\bullet-} + H_2PO_4^- \rightarrow (CH_3)_2NCONH\dot{N}CON(CH_3)_2 + HPO_4^{2-}$	7×10^7	6-9			p.r.	D.k. at 300 nm in soln. contg. 10^{-4} mol L^{-1} *tert*-BuOH and diamide.	751194

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.64	**1,2-Dicarboxy-1,2-dihydroxyethyl**							
27.64.1	**2-Methyl-1,4-naphthoquinone**							
	$HO_2C\dot{C}OHCHOHCO_2H$ + 2-CH_3NQ →	7.0×10^8	3.2			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. tartaric acid; 14% *e*-transfer.	731047
27.65	**1,2-Dicarboxy-1,2-dihydroxyethyl, dianion**							
27.65.1	**Hemin c**							
	$^-O_2C\dot{C}OHCHOHCO_2^-$ + Hem-Fe^{III} → Hem-Fe^{II}	8.1×10^7	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.02 mol L^{-1} tartrate.	75A241
27.65.2	**2-Methyl-1,4-naphthoquinone**							
	$^-O_2C\dot{C}OHCHOHCO_2^-$ + 2-CH_3NQ →	7.0×10^8	11.0			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. tartrate ion; 69% *e*-transfer.	731047
27.65.3	**Cytochrome C**							
	$^-O_2C\dot{C}OHCHOHCO_2^-$ + Cyt C (Fe^{3+}) →	1.7×10^8	7			p.r.	P.b.k. at 550 nm in soln. contg. tartrate.	751012
27.65.4	**Cytochrome C, carboxymethylated**							
	$^-O_2C\dot{C}OHCHOHCO_2^-$ + Cxm-cyt C →	2.8×10^7	7			p.r.	P.b.k. at 550 nm in soln. contg. 0.01 mol L^{-1} tartrate ion.	78A288
27.65.5	**Metmyoglobin**							
	$^-O_2C\dot{C}OHCHOHCO_2^-$ + Fe^{3+}Mb →	3.5×10^7	7			p.r.	Abs. changes in soln. contg. 0.01 mol L^{-1} tartrate.	78A288
27.66	**1,2-Dicarboxyethyl**							
27.66.1	**1,2-Dicarboxyethyl**							
	$HO_2C\dot{C}HCH_2CO_2H$ + $HO_2C\dot{C}HCH_2CO_2H$ →	4×10^8				p.r.	D.k. in N_2O-satd. soln. contg. succinic acid; pH study (2-14)	85A487
27.66.2	**Hexachloroiridate(IV) ion**							
	$HO_2C\dot{C}HCH_2CO_2H$ + $IrCl_6^{2-}$ → $IrCl_6^{3-}$ + other prod.	4.6×10^8	3.3			p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. succinate.	82A041
27.67	**1,2-Dicarboxyethyl, dianion**							
27.67.1	**1,2-Dicarboxyethyl, dianion**							
	$^-O_2CCH_2\dot{C}HCO_2^-$ + $^-O_2CCH_2\dot{C}HCO_2^-$ →	5×10^6				p.r.	D.k. in N_2O-satd. soln. contg. succinic acid; pH study (2-14)	85A487
27.67.2	**Hexachloroiridate(IV) ion**							
	$^-O_2CCH_2\dot{C}HCO_2^-$ + $IrCl_6^{2-}$ → $IrCl_6^{3-}$ + other prod.	1.1×10^8	7			p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. succinate.	82A041
27.68	**1,2-Dicarboxy-2-hydroxyethenyl, dianion**							
27.68.1	**Hydroxide ion**							
	$^-O_2CC(OH)=\dot{C}CO_2^-$ + OH^- → $^-O_2CC(O^-)=\dot{C}CO_2^-$ + H_2O	1.9×10^9				p.r.	D.k. (esr) in N_2O-satd. soln. contg. acetylenedicarboxylate ion as a function of [OH^-]; product protonates and isomerizes to $^-O_2CC(O)\dot{C}HCO_2^-$.	82D088
27.69	**1,2-Dicarboxy-1-hydroxyethyl**							
27.69.1	**1,2-Dicarboxy-1-hydroxyethyl**							
	$HO_2C\dot{C}OHCH_2CO_2H$ + $HO_2C\dot{C}OHCH_2CO_2H$ →	2.5×10^8				p.r.	D.k. in N_2O-satd. soln. contg. malic acid; pH study (2-14)	85A487
27.70	**1,2-Dicarboxy-1-hydroxyethyl, monoanion**							
27.70.1	**1,2-Dicarboxy-1-hydroxyethyl, monoanion**							
	$HO_2CCH_2\dot{C}OHCO_2^-$ + $HO_2CCH_2\dot{C}OHCO_2^-$ →	1.3×10^8				p.r.	D.k. in N_2O-satd. soln. contg. malic acid; pH study (2-14)	85A487

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.71	**1,2-Dicarboxy-1-hydroxyethyl, dianion**							
27.71.1	**1,2-Dicarboxy-1-hydroxyethyl, dianion**							
	$^-O_2C\dot{C}OHCH_2CO_2^- + {}^-O_2C\dot{C}OHCH_2CO_2^- \rightarrow$	2.0×10^6				p.r.	D.k. in N_2O-satd. soln. contg. malic acid; pH study (2-14)	85A487
27.71.2	**2-Methyl-1,4-naphthoquinone**							
	$^-O_2C\dot{C}OHCH_2CO_2^- + 2\text{-}CH_3NQ \rightarrow$	1.1×10^9	7.0			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. malate;; 47% *e*-transfer.	731047
		3.1×10^9	6.2			p.r.	P.b.k. at 395 nm in soln. contg. oxaloacetate and 1 mol L^{-1} *tert*- BuOH; 92% *e*-transfer.	731047
27.71.3	**Nifuroxime**							
	$^-O_2C\dot{C}OHCH_2CO_2^- + NF \rightarrow$	1.2×10^8	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} malate ion; 30% *e*-transfer.	731099
27.71.4	**Cytochrome C**							
	$^-O_2C\dot{C}OHCH_2CO_2^- +$ Cyt C (Fe^{3+}) $\rightarrow$ Cyt C (Fe^{2+}) + other prod.	8.5×10^7	6.4			p.r.	P.b.k. at 550 nm in malate soln.: $E_a = 12$ kJ mol^{-1}.	741007
27.72	**1,2-Dicarboxy-1-hydroxyethyl, trianion**							
27.72.1	**1,2-Dicarboxy-1-hydroxyethyl, trianion**							
	$^-O_2CCH_2\dot{C}(O^-)CO_2^- + {}^-O_2CCH_2\dot{C}(O^-)CO_2^- \rightarrow$	2.0×10^5				p.r.	D.k. in N_2O-satd. soln. contg. malic acid; pH study (2-14)	85A487
27.73	**1,2-Dicarboxy-2-hydroxyethyl, dianion**							
27.73.1	**Copper(II) ion**							
	$^-O_2CCHOH\dot{C}HCO_2^- + Cu^{2+} \rightarrow$ $CuCH(CO_2)C(OH)CO_2$	$<2 \times 10^7$	1.5			p.r.	P.b.k. in N_2O-satd. soln. contg. $(5\text{-}10) \times 10^{-5}$ mol L^{-1} $CuSO_4$ and $(2.5\text{-}10) \times 10^{-4}$ mol L^{-1} fumarate; adduct yields Cu^+.	80A277
		3.1×10^7	2.1					
		6.4×10^7	2.6					
		1.2×10^8	3.0					
		1.8×10^8	3.5					
		8.0×10^8	5.0					
		8×10^8	6					
27.73.2	**Nifuroxime**							
	$^-O_2CCHOH\dot{C}HCO_2^- + NF \rightarrow$	2.4×10^9	7			p.r.	P.b.k. at 390 nm in soln. contg. maleate ion; 3% *e*-transfer.	731099
27.74	**Dicarboxy(hydroxy)methyl, dianion**							
27.74.1	**2-Methyl-1,4-naphthoquinone**							
	$^\bullet C(OH)(CO_2^-)_2 + 2\text{-}CH_3NQ \rightarrow$ $[2\text{-}CH_3NQ]^{\bullet -}$ + other prod.	2.5×10^9	9.2			p.r.	P.b.k. at 395 nm in soln. contg. ketomalonate and 1 mol L^{-1} *tert*- BuOH; 94% *e*-transfer; $pK_a = 12.9$.	731047
27.75	**Dicarboxymethyl**							
27.75.1	**Hexaamminecobalt(III) ion**							
	$^\bullet CH(CO_2H)_2 + Co(NH_3)_6^{3+} \rightarrow$	$<8.0 \times 10^6$	2.5			p.r.	D.k. in Ar-satd. soln. contg. 0.01 mol L^{-1} malonic acid.	72A018
27.75.2	**Chromium(II) ion**							
	$^\bullet CH(CO_2H)_2 + Cr^{2+} \rightarrow CrCH(CO_2H)_2^{2+}$	6.0×10^7	~1			p.r.	P.b.k. in Ar-satd. soln. contg. malonic acid and $HClO_4$.	741146
27.75.3	**Hexaammineruthenium(III) ion**							
	$^\bullet CH(CO_2H)_2 + Ru(NH_3)_6^{3+} \rightarrow$	$<1.1 \times 10^8$	2.5			p.r.	D.k. in Ar-satd. soln. contg. 0.01 mol L^{-1} malonic acid.	72A018
27.75.4	***Titanium(III)***							
	$^\bullet CH(CO_2H)_2 +$ Ti(III) $\rightarrow$ Ti(IV) + other prod.	8×10^6	~0			*e*-r.	Estd. from effect of $[Ti^{III}]$ on esr signal intensity; assuming $2k(R + R) \approx 10^9$ L mol^{-1} s^{-1}.	730249

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.76	**Dicarboxymethyl dianion**							
27.76.1	**5,10,15,20-Tetrakis(4-sulfonatophenyl)porphinatomanganate(II) ion**							
	$^{\bullet}CH(CO_2^-)_2 + MnTPPS^{4-} \rightarrow$	5.8×10^8	6.6		295	p.r.	P.b.k. in soln. contg. malonate; radical oxidizes Mn(II) to Mn(III).	92A391
27.76.2	**Ascorbate ion**							
	$^{\bullet}CH(CO_2^-)_2 + AH^- \rightarrow CH_2(CO_2^-)_2 + A^{\bullet -}$	1.3×10^7	7.5			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.8 mol L^{-1} malonate.	733006
27.76.3	**Nifuroxime**							
	$^{\bullet}CH(CO_2^-)_2 + NF \rightarrow$	1.3×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} malonate ion; 3% *e*-transfer.	731099
27.77	**Dichloro(cyano)methyl**							
27.77.1	**Oxygen**							
	$\dot{C}Cl_2CN + O_2 \rightarrow CCl_2(CN)OO^{\bullet}$	3.9×10^8				p.r.	Eval. from leveling off of rate of reaction of peroxyl radical with ABTS, chlorpromazine, promethazine and ascorbate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L^{-1} *tert*-BuOH and trichloroacetonitrile.	88A364
27.78	**1,1-Dichloro-2-oxoethyl**							
27.78.1	**1,1-Dichloro-2-oxoethyl**							
	$^{\bullet}CCl_2CHO + {}^{\bullet}CCl_2CHO \rightarrow$	3.1×10^8				p.r.	D.k. at 265 nm in N_2O-satd. soln. contg. 10^{-4} mol L^{-1} trichloroethylene; $\varepsilon = 3200\ L\ mol^{-1}\ s^{-1}$ (from graph).	710709
27.79	**Dicyclohexano-18-crown-6 radical**							
27.79.1	**Dicyclohexano-18-crown-6 radical**							
	$C_{20}H_{35}O_5 + C_{20}H_{35}O_5 \rightarrow$	1.4×10^9 2.5×10^8 1.8×10^8	1.0 6.5 13.5			p.r.	D.k. at 260 nm in Ar-satd. soln. at pH 1 and in N_2O-satd. soln. at pH 6.5 and 13.5; $\varepsilon =$ 1300 $L\ mol^{-1}\ cm^{-1}$ at pH ≥ 6.5 and $\varepsilon = 3500$ $L\ mol^{-1}\ cm^{-1}$ at pH 1.	88A440
27.80	**1,1-Diethoxyethene radical cation**							
27.80.1	**Hydroxide ion**							
	$[(C_2H_5O)_2C{=}CH_2]^{\bullet +} + OH^- \rightarrow$ $^{\bullet}CH_2CO_2C_2H_5 + EtOH$	2.5×10^9				p.r.	Condy. changes; radical from 2-chloro-1,1-diethoxyethane.	81D027
27.81	**1-[(Diethoxy)methoxy]ethyl**							
27.81.1	**Ferricyanide ion**							
	$(C_2H_5O)_2CHO\dot{C}HCH_3 + Fe(CN)_6^{3-} \rightarrow$ $(C_2H_5O)_2CHOCH^+CH_3 + Fe(CN)_6^{4-}$	1.6×10^9	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L^{-1} triethyl orthoformate and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $Fe(CN)_6^{3-}$.	86A155
27.81.2	**Hexachloroiridate(IV) ion**							
	$(C_2H_5O)_2CHO\dot{C}HCH_3 + IrCl_6^{2-} \rightarrow$ $(C_2H_5O)_2CHOCH^+CH_3 + IrCl_6^{3-}$	2.9×10^9	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L^{-1} triethyl orthoformate and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $IrCl_6^{2-}$; $k = 2.8 \times 10^9$ $L\ mol^{-1}\ s^{-1}$ from condy. meas.	86A155
27.82	**1-(Diethylamino)ethyl**							
27.82.1	**Benzophenone**							
	$CH_3\dot{C}HNEt_2 + (C_6H_5)_2CO \rightarrow$ $(C_6H_5)_2\dot{C}O^- + H^+ + CH_2{=}CHNEt_2$	1.2×10^8				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and benzophenone; k increases as water increases to 80%.	86A248

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.82	**1-(Diethylamino)ethyl**							
		1.5×10^9	~12			f.p./rq	P.b.k. at 620 nm in soln. contg. 0.29 mol L^{-1} triethylamine, benzophenone and 20% acetonitrile. Reaction followed quenching of ^{3}[BP]* by triethylamine.	84A285
27.82.2	**4-Chlorobenzophenone**							
	$CH_3\dot{C}HNEt_2 + 4\text{-}ClC_6H_4COC_6H_5 \rightarrow 4\text{-}ClC_6H_4\dot{C}O^-C_6H_5 + H^+ + CH_2{=}CHNEt_2$	4.3×10^8				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4-chlorobenzophenone.	86A248
27.82.3	**4,4'-Dichlorobenzophenone**							
	$CH_3\dot{C}HNEt_2 + (4\text{-}ClC_6H_4)_2CO \rightarrow (4\text{-}ClC_6H_4)_2\dot{C}O^- + H^+ + CH_2{=}CHNEt_2$	1.4×10^9				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4,4'-dichlorobenzophenone.	86A248
27.82.4	**4,4'-Dimethoxybenzophenone**							
	$CH_3\dot{C}HNEt_2 + (4\text{-}CH_3OC_6H_4)_2CO \rightarrow (4\text{-}CH_3OC_6H_4)_2\dot{C}O^- + H^+ + CH_2{=}CHNEt_2$	5.2×10^6				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4,4'-dimethoxybenzophenone.	86A248
27.82.5	**4-Fluorobenzophenone**							
	$CH_3\dot{C}HNEt_2 + 4\text{-}FC_6H_4COC_6H_5 \rightarrow 4\text{-}FC_6H_4\dot{C}O^-C_6H_5 + H^+ + CH_2{=}CHNEt_2$	2.1×10^8				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4-fluorobenzophenone.	86A248
27.82.6	**4-Methoxybenzophenone**							
	$CH_3\dot{C}HNEt_2 + 4\text{-}CH_3OC_6H_4COC_6H_5 \rightarrow 4\text{-}CH_3OC_6H_4\dot{C}O^-C_6H_5 + H^+ + CH_2{=}CHNEt_2$	2.9×10^7				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4-methoxybenzophenone.	86A248
27.82.7	**4-Methylbenzophenone**							
	$CH_3\dot{C}HNEt_2 + 4\text{-}CH_3C_6H_4COC_6H_5 \rightarrow 4\text{-}CH_3C_6H_4\dot{C}O^-C_6H_5 + H^+ + CH_2{=}CHNEt_2$	8.3×10^7				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4-methylbenzophenone.	86A248
27.82.8	**2-Methyl-1,4-naphthoquinone**							
	$CH_3\dot{C}HNEt_2 + 2\text{-}CH_3NQ \rightarrow$	4.6×10^9	11.6			p.r.	P.b.k. at 395 nm in soln. contg. triethylamine; 37% e-transfer; ~10% e-transfer at pH 6.	731047
27.82.9	**4-(Trifluoromethyl)benzophenone**							
	$CH_3\dot{C}HNEt_2 + 4\text{-}CF_3C_6H_4COC_6H_5 \rightarrow 4\text{-}CF_3C_6H_4\dot{C}O^-C_6H_5 + H^+ + CH_2{=}CHNEt_2$	1.6×10^9				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4-(trifluoromethyl)benzophenone.	86A248
27.83	**2-(Diethylamino)ethyl, conjugate acid**							
27.83.1	**Copper(I) ion**							
	$^{\bullet}CH_2CH_2NEt_2H^+ + Cu^+ \rightarrow CuCH_2CH_2NEt_2H^{2+}$	7.5×10^8	2.2-3.5			p.r.	P.b.k. at 370 nm in N_2O-satd. soln. contg. 0.05-0.1 mol L^{-1} triethylamine, 0-0.001 mol L^{-1} $CuSO_4$ and (0.05-0.13) $\times 10^{-3}$ mol L^{-1} Cu^+.	93A473
27.84	**1,2-Dihydroxybutyl**							
27.84.1	**Hydrogen ion**							
	$CH_3CH_2CHOH\dot{C}HOH + H^+ \rightarrow CH_3CH_2\dot{C}HCHO + H_2O + H^+$	1.5×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1,2-butanediol at varied [H^+]; acid catalysis.	86A220

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref
27.84	**1,2-Dihydroxybutyl** — Continued							
27.84.2	**1,4-Benzoquinone**							
	$CH_3CH_2CHOH\dot{C}HOH + Q \rightarrow Q^{\cdot-}$ + other prod.	2.5×10^9	6-7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1,2-butanediol.	86A220
27.85	**1,4-Dihydroxybutyl**							
27.85.1	**Cysteamine, conjugate acid**							
	$^{\cdot}CHOHCH_2CH_2CH_2OH + HSCH_2CH_2NH_3^+ \rightarrow HO(CH_2)_4OH + H_3N^+CH_2CH_2S^{\cdot}$	1.1×10^8				p.r.	P.b.k. at 410 nm ($RSSR^{\cdot-}$) in N_2O- satd. soln. contg. 1,4-butanediol.	680132
27.86	**1,2-Dihydroxycyclohexyl**							
27.86.1	**Hydrogen ion**							
	$c\text{-}\dot{C}_6H_9\text{-}1,2\text{-}(OH)_2 + H^+ \rightarrow H_2O + c\text{-}C_6H_{10}(=O) + H^+$	1.3×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1,2-cyclohexanediol at varied $[H^+]$; acid catalysis.	86A220
27.86.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$c\text{-}\dot{C}_6H_9\text{-}1,2\text{-}(OH)_2 + MV^{2+} \rightarrow MV^{\cdot+}$ + other prod.	1.3×10^9	6			p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1,2-cyclohexanediol	86A220
27.86.3	**Dithiothreitol**							
	$c\text{-}\dot{C}_6H_9\text{-}1,2\text{-}(OH)_2 + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\cdot} + c\text{-}C_6H_{10}\text{-}1,2\text{-}(OH)_2$	1.4×10^8	7.4			p.r.	P.b.k. at 390 nm ($DTT^{\cdot-}$) in N_2O-satd. soln. contg. dithiothreitol and 1,2-cyclohexanediol.	87A250
27.87	**1,3-Dihydroxycyclohexyl**							
27.87.1	**Dithiothreitol**							
	$c\text{-}\dot{C}_6H_9\text{-}1,3\text{-}(OH)_2 + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\cdot} + c\text{-}C_6H_{10}\text{-}1,3\text{-}(OH)_2$	3.4×10^8	7.4			p.r.	P.b.k. at 390 nm ($DTT^{\cdot-}$) in N_2O-satd. soln. contg. dithiothreitol and 1,3-cyclohexanediol.	87A250
27.88	**1,4-Dihydroxycyclohexyl**							
27.88.1	**Dithiothreitol**							
	$c\text{-}\dot{C}_6H_9\text{-}1,4\text{-}(OH)_2 + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\cdot} + c\text{-}C_6H_{10}\text{-}1,4\text{-}(OH)_2$	3.4×10^8	7.4			p.r.	P.b.k. at 390 nm ($DTT^{\cdot-}$) in N_2O-satd. soln. contg. dithiothreitol and 1,4-cyclohexanediol.	87A250
27.89	**1,3-Dihydroxy-2,2-di(hydroxymethyl)propyl**							
27.89.1	**Hemin c**							
	$^{\cdot}CHOHC(CH_2OH)_3 + Hem\text{-}Fe^{III} \rightarrow Hem\text{-}Fe^{II}$ + other prod.	3.0×10^8 2.8×10^8	7.0 11.8			p.r.	P.b.k. at 413 nm in N_2O-satd. soln. contg. 0.25 mol L^{-1} pentaerythritol.	75A241
27.89.2	**Lead(I) ions**							
	$^{\cdot}CHOHC(CH_2OH)_3 + Pb^+ \rightarrow PbCHOHC(CH_2OH)_3^+$	7.0×10^8				p.r.	D.k. at 300 nm (Pb^+) in soln. contg. Pb^{2+} and pentaerythritol knowing initial [R] and $[Pb^+]$; cor. for R + R.	761170
27.89.3	**Cytochrome C**							
	$^{\cdot}CHOHC(CH_2OH)_3 + Cyt\ C\ (Fe^{3+}) \rightarrow Cyt\ C\ (Fe^{2+})$ + other prod.	$<10^6$ 1.4×10^8 1.6×10^8	5.6 9.1 9.8			p.r.	P.b.k. at 550 nm; radical from pentaerythritol.	751012
27.90	**1,2-Dihydroxy-1,2-dimethylpropyl**							
27.90.1	**Hydrogen ion**							
	$(CH_3)_2C(OH)\dot{C}OHCH_3 + H^+ \rightarrow CH_3C(CH_3)COCH_3 + H_2O + H^+$	1.7×10^9				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-methyl-2,3-butanediol at varied $[H^+]$; acid catalysis.	86A220

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.90	**1,2-Dihydroxy-1,2-dimethylpropyl** — Continued							
27.90.2	**1,4-Benzoquinone**							
	$(CH_3)_2C(OH)\dot{C}OHCH_3 + Q \rightarrow Q^{\cdot-} +$ other prod.	1.9×10^9	6-7			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-methyl-2,3-butanediol	86A220
27.91	**1,1-Dihydroxyethyl**							
27.91.1	**Tetranitromethane**							
	$CH_3\dot{C}(OH)_2 + C(NO_2)_4 \rightarrow CH_3CO_2^- +$ $C(NO_2)_3^- + {}^{\cdot}NO_2 + H^+$	2.8×10^9	6.5		~293	p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 2×10^{-3} mol L^{-1} acetaldehyde and $(0.4\text{-}2.1) \times 10^{-4}$ mol L^{-1} TNM.	88A266
27.92	**1,2-Dihydroxy-1-(hydroxymethyl)ethyl**							
27.92.1	**Cadmium(II) ion**							
	$HOCH_2\dot{C}OHCH_2OH + Cd^{2+} \rightarrow$	$<2.5 \times 10^5$				p.r.	No reaction obs.	751153
27.92.2	**Bis(1,10-phenanthroline)copper(II) ion**							
	$HOCH_2\dot{C}OHCH_2OH + Cu(phen)_2^{2+} \rightarrow$ $Cu(phen)_2^+ +$ other prod.	1.1×10^8	7			p.r.	P.b.k. in soln. contg. 0.1 mol L^{-1} glycerol; reacting radicals also include ${}^{\cdot}CHOHCHOHCH_2OH$.	90A517
27.92.3	**Ferricyanide ion**							
	$HOCH_2\dot{C}OHCH_2OH + Fe(CN)_6^{3-} \rightarrow$	3.3×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} glycerol; radical mixture also contains ${}^{\cdot}CHOHCHOHCH_2OH$.	690522
27.92.4	**Hemin c**							
	$HOCH_2\dot{C}OHCH_2OH + Hem\text{-}Fe^{III} \rightarrow$ $Hem\text{-}Fe^{II} +$ other prod.	1.3×10^9	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} glycerol; radical mixture contains ${}^{\cdot}CHOHCHOHCH_2OH$.	75A241
27.92.5	**Hydrogen ion**							
	$HOCH_2\dot{C}OHCH_2OH + H^+ \rightarrow$ $HOCH_2\dot{C}HCHO + H_2O + H^+$	3.5×10^6				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} glycerol at varied $[H^+]$; acid catalysis.	86A220
27.92.6	**Oxygen**							
	$HOCH_2\dot{C}OHCH_2OH + O_2 \rightarrow$ addn.	3.3×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.4 mol L^{-1} glycerol and ferricyanide. rel. to $k(HOCH_2\dot{C}OHCH_2OH + Fe(CN)_6^{3-}) = 3.3 \times 10^9$ L $mol^{-1}\ s^{-1}$.	690522
27.92.7	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$HOCH_2\dot{C}OHCH_2OH + MV^{2+} \rightarrow MV^{\cdot+}$ + other prod.	1.2×10^8	6			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} glycerol. Radical mixture also contains ${}^{\cdot}CHOHCHOHCH_2OH$.	86A220
27.92.8	**Nifuroxime**							
	$HOCH_2\dot{C}OHCH_2OH + NF \rightarrow$	1.3×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.2 mol L^{-1} glycerol; 20% e-transfer.	731099
27.92.9	**Tetranitromethane**							
	$HOCH_2\dot{C}OHCH_2OH + C(NO_2)_4 \rightarrow$	2.4×10^9				p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} glycerol.	640133
27.92.10	**Cytochrome C**							
	$HOCH_2\dot{C}OHCH_2OH +$ Cyt C $(Fe^{3+}) \rightarrow$	2.5×10^6	7			p.r.	P.b.k. at 550 nm; radicals from glycerol.	751012
27.93	**2,3-Dihydroxy-1-(hydroxymethyl)propenyl**							
27.93.1	**Hydrogen ion**							
	$HOCH_2C(OH)=\dot{C}CH_2OH + H^+ \rightarrow$ $HOCH_2C\dot{O}CHCH_2OH$	$\geq 5 \times 10^6$	1-2			chem.	Esr study in soln. contg. Ti(III), H_2O_2 and 2-butyne-1,4-diol using $k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	89D228

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.93	**2,3-Dihydroxy-1-(hydroxymethyl)propenyl** — Continued							
	27.93.2 2-Butyne-1,4-diol							
	$HOCH_2C(OH)=\dot{C}CH_2OH + HOCH_2C\equiv CCH_2OH \rightarrow HO\dot{C}HC\equiv CCH_2OH + HOCH_2C(OH)=CHCH_2OH$	$\geq 1.6 \times 10^7$	1.5			chem.	Esr study in soln. contg. Ti(III), H_2O_2 and 2-butyne-1,4-diol using $k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	89D228
27.94	**2,3-Dihydroxy-4-mercaptobutyl**							
	27.94.1 Dithiothreitol							
	$^{\bullet}CH_2(CHOH)_2CH_2SH + HSCH_2(CHOH)_2CH_2SH \rightarrow CH_3(CHOH)_2CH_2SH + HSCH_2(CHOH)_2CH_2S^{\bullet}$	5.5×10^6	7.1			p.r.	P.b.k. at 390 nm in deaerated soln. contg. 0.02 mol L^{-1} dithiothreitol.	89A096
27.95	**Dihydroxymethyl**							
	27.95.1 Dihydroxymethyl							
	$^{\bullet}CH(OH)_2 + {}^{\bullet}CH(OH)_2 \rightarrow HCO_2H + CH_2(OH)_2$	1.4×10^9			293	f.p.	D.k. at 260 nm in soln. contg. H_2O_2 and formaldehyde; $\varepsilon = 550$ L $mol^{-1}\ cm^{-1}$; unclear whether k or $2k$.	91A163
		3.6×10^8 2.3×10^8	6.3 12			p.r.	D.k. at 250 nm, as well as condy. change, in N_2O-satd. soln. contg. formaldehyde, as well as in soln. contg. *tert*-BuOH and CO; $\varepsilon \cong 850$ and 1500 L $mol^{-1}\ cm^{-1}$ at pH 6 and 11.8, resp.; $pK_a = 9.5$.	710424
		5.0×10^8	5			p.r.	D.k. at 230 nm in N_2O-satd. soln. contg. formaldehyde; $\varepsilon = 520$ L $mol^{-1}\ cm^{-1}$.	710924
	27.95.2 Chromium(II) ion							
	$^{\bullet}CH(OH)_2 + Cr^{2+} \rightarrow CrCH(OH)_2^{2+}$	1.3×10^8	2.8-6			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.3 mol L^{-1} formaldehyde, 10^{-3} mol L^{-1} Cr^{2+} and 0.3 mol L^{-1} Na perchlorate. Product forms $CrCHO^{2+}$, $k = 1 \times 10^2\ s^{-1}$.	85A084
	27.95.3 Hydrogen peroxide							
	$^{\bullet}CH(OH)_2 + H_2O_2 \rightarrow CH_2(OH)_2 + HO_2^{\bullet}$	7.4×10^5			293	f.p.	D.k. at 260 nm in Ar-satd. soln. contg. H_2O_2 and formaldehyde.	91A163
		3.5×10^6			293	phot.	Estd. from chain termination.	91A163
	27.95.4 Oxygen							
	$^{\bullet}CH(OH)_2 + O_2 \rightarrow CH(OH)_2OO^{\bullet}$	3.5×10^9			293	f.p.	D.k. in air-satd. soln. contg. H_2O_2 and formaldehyde.	91A163
		4.5×10^9	3.5-6.5		294	p.r.	Increase in condy obs. in N_2O/O_2 (80/20 v:v) satd. soln. contg. 5×10^{-3} mol L^{-1} formaldehyde and $(2\text{-}27) \times 10^{-5}$ mol L^{-1} oxygen; products are formate and H_2O_2.	80A282
		7.7×10^8	5.7			p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. formaldehyde, as well as condy. increase.	710424
	27.95.5 Nitrobenzene							
	$^{\bullet}CH(OH)_2 + C_6H_5NO_2 \rightarrow HCO_2^- + 2\ H^+ + [C_6H_5NO_2]^{\bullet -}$	1.9×10^9	5.8			p.r.	P.b.k. at 290 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formaldehyde; also condy. study.	710424
27.96	**Dihydroxymethyl, conjugate base**							
	27.96.1 Nitrobenzene							
	$^{\bullet}CH(OH)O^- + C_6H_5NO_2 \rightarrow HCO_2^- + H^+ + [C_6H_5NO_2]^{\bullet -}$	4.5×10^9	12			p.r.	P.b.k. at 290 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} formaldehyde; also condy. study.	710424

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.97	**1,4-Dihydroxy-1-methylbutyl**							
27.97.1	**1,4-Dihydroxy-1-methylbutyl**							
	$CH_3CH(OH)CH_2\dot{C}(OH)CH_3$ + $CH_3CH(OH)CH_2\dot{C}(OH)CH_3$ →	$\sim 5 \times 10^8$	6.5			p.r.	D.k. at 280 nm in N_2O-satd. soln. contg. 2,4-pentanediol; used G(radicals) = 6.0×10^{-7} mol J^{-1}; mixture of radicals.	94P051
27.98	**1,2-Dihydroxy-1-methylethyl**							
27.98.1	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$CH_3\dot{C}OHCH_2OH + MV^{2+} \rightarrow MV^{\bullet+}$ + other prod.	$\sim 5 \times 10^8$	6			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1,2-propanediol.	86A220
27.99	**1,2-Dihydroxy-1-methylpropyl**							
27.99.1	**Hydrogen ion**							
	$CH_3CHOH\dot{C}OHCH_3 + H^+ \rightarrow$ $CH_3C\dot{O}CHCH_3 + H_2O + H^+$	9.7×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2,3-butanediol at varied $[H^+]$; acid catalysis.	86A220
27.99.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$CH_3CHOH\dot{C}OHCH_3 + MV^{2+} \rightarrow MV^{\bullet+}$ + other prod.	1.1×10^9	6			p.r.	P.b.k. at 600 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2,3-butanediol	86A220
27.99.3	**Tetranitromethane**							
	$CH_3CHOH\dot{C}OHCH_3 + C(NO_2)_4 \rightarrow$	3.3×10^9				p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} 2,3-butanediol.	730126
27.100	**1,2-Dihydroxy-1-methylpropyl, conjugate base**							
27.100.1	**First-order reaction**							
	$CH_3CHOH\dot{C}O^-CH_3 \rightarrow OH^-$ + $CH_3C\dot{O}CHCH_3$	$\geq 8.1 \times 10^6\ s^{-1}$	≥12			p.r.	C.k. in N_2O-satd. soln. contg. 2,3-butanediol; rel. to k(R + N-methylisonicotinate ion) = 3.8×10^9 L $mol^{-1}\ s^{-1}$.	79A051
27.101	**1,2-Dihydroxy-2-methylpropyl**							
27.101.1	**Hydrogen ion**							
	$(CH_3)_2COH\dot{C}HOH + H^+ \rightarrow$ $^{\bullet}C(CH_3)_2CHO + H_2O + H^+$	7.0×10^8				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-methylpropane-1,2-diol at varied $[H^+]$; acid catalysis.	86A220
27.101.2	**1,4-Benzoquinone**							
	$(CH_3)_2COH\dot{C}HOH + Q \rightarrow Q^{\bullet-}$ + other prod.	2.0×10^9	6-7			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-methyl-1,2-propanediol.	86A220
27.102	**1,2-Dihydroxypropyl**							
27.102.1	**Hydrogen ion**							
	$^{\bullet}CHOHCHOHCH_3 + H^+ \rightarrow$ $CH_3\dot{C}HCHO + H_2O + H^+$	9×10^7				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1,2-propanediol at varied $[H^+]$; acid catalysis.	86A220
27.102.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$^{\bullet}CHOHCHOHCH_3 + MV^{2+} \rightarrow MV^{\bullet+}$ + other prod.	$\sim 1 \times 10^8$	6			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1,2-propanediol.	86A220
27.102.3	**Tetranitromethane**							
	$^{\bullet}CHOHCHOHCH_3 + C(NO_2)_4 \rightarrow$	3.2×10^9				p.r.	P.b.k. in soln. contg. 0.2 mol L^{-1} 1,2-propanediol.	730126
27.103	**1,2-Dihydroxypropyl, conjugate base**							
27.103.1	**First-order reaction**							
	$CH_3CHOH\dot{C}HO^- \rightarrow OH^-$ + $CH_3\dot{C}HCHO$	$5.3 \times 10^6\ s^{-1}$	≥12			p.r.	C.k. in N_2O-satd. soln. contg. 1,2-propanediol; rel. to k(R + N-methylisonicotinate ion) = 3.8×10^9 L $mol^{-1}\ s^{-1}$.	79A051

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
27.104	**1,3-Dihydroxypropyl**							
27.104.1	**Cysteamine, conjugate acid**							
	$^{\bullet}CHOHCH_2CH_2OH + HSCH_2CH_2NH_3^+ \rightarrow$	$<1 \times 10^7$				p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O- satd. soln. contg. allyl alcohol.	680132
27.104.2	**Nifuroxime**							
	$^{\bullet}CHOHCH_2CH_2OH + NF \rightarrow$	5.1×10^9	7			p.r.	P.b.k. at 395 nm (NF^-) in N_2O-satd. soln. contg. allyl alcohol; 3% e-transfer.	731062 731099
27.104.3	**4-Nitroacetophenone**							
	$^{\bullet}CHOHCH_2CH_2OH + PNAP \rightarrow$	2.7×10^9	7			p.r.	P.b.k. at 360 and 550 nm ($PNAP^-$) in N_2O-satd. soln. contg. allyl alcohol; 3% e-transfer.	731062
27.104.4	**Nitrobenzene**							
	$^{\bullet}CHOHCH_2CH_2OH + C_6H_5NO_2 \rightarrow$	$\sim 1.5 \times 10^9$	7			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. allyl alcohol; 5% e-transfer.	731062
27.105	**1-(Diisobutylphosphatomethyl)-1-methylethyl**							
27.105.1	**Water**							
	$(CH_3)_2\dot{C}CH_2OPO_3[CH_2CH(CH_3)_2]_2 + H_2O \rightarrow H^+ + (CH_3)_2\dot{C}CH_2OH + HOPO_3[CH_2CH(CH_3)_2]_2$	1.4×10^4 s^{-1}	4.5-5		292	p.r.	Condy. changes; N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} tris(2-methyl-1-propyl) phosphate	82A350
27.106	**1,1-Dimethoxyethene radical cation**							
27.106.1	**Hydroxide ion**							
	$[(CH_3O)_2C{=}CH_2]^{\bullet+} + OH^- \rightarrow {}^{\bullet}CH_2CO_2CH_3 + MeOH$	4.2×10^9				p.r.	Condy. changes; radical from 2-chloro-1,1-dimethoxyethane.	81D027
27.106.2	**Hydrogen phosphate ion**							
	$[(CH_3O)_2C{=}CH_2]^{\bullet+} + HPO_4^{2-} \rightarrow (CH_3O)_2C(OPO_3^{2-})\dot{C}H_2$	9×10^5	3			phot.	Esr study; radical from 2-chloro-1,1-dimethoxyethane; rel. to $k([(CH_3O)_2C{=}CH_2]^{\bullet+} + OH^-)$.	81D027
27.107	**1,1-Dimethoxyethyl**							
27.107.1	**Tetranitromethane**							
	$CH_3\dot{C}(OCH_3)_2 + C(NO_2)_4 \rightarrow CH_3C(OCH_3)_2OH + {}^{\bullet}NO_2 + C(NO_2)_3^-$	3×10^9	6.5			p.r.	P.b.k. at 300 and 350 nm in N_2O-satd. soln. contg. TNM and acetaldehyde dimethyl acetal.	90A004
27.108	**(Dimethoxy)methoxymethyl**							
27.108.1	**Ferricyanide ion**							
	$(CH_3O)_2CHO\dot{C}H_2 + Fe(CN)_6^{3-} \rightarrow (CH_3O)_2CHOCH_2^+ + Fe(CN)_6^{4-}$	1.7×10^9	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L^{-1} trimethyl orthoformate and (5-50) $\times 10^{-5}$ mol L^{-1} $Fe(CN)_6^{3-}$; $k = 1.8 \times 10^9$ L mol^{-1} s^{-1} from condy. meas.	86A155
27.108.2	**Hexachloroiridate(IV) ion**							
	$(CH_3O)_2CHO\dot{C}H_2 + IrCl_6^{2-} \rightarrow (CH_3O)_2CHOCH_2^+ + IrCl_6^{3-}$	3.8×10^9	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L^{-1} trimethyl orthoformate and (5-50) $\times 10^{-5}$ mol L^{-1} $IrCl_6^{2-}$; same value from condy. expts.	86A155
27.108.3	**Tetranitromethane**							
	$(CH_3O)_2CHO\dot{C}H_2 + C(NO_2)_4 \rightarrow (CH_3O)_2CHOCH_2^+ + {}^{\bullet}NO_2 + C(NO_2)_3^-$	$\sim 1 \times 10^9$	7.9		293	p.r.	P.b.k. at 350 nm in soln. contg. 0.01 mol L^{-1} trimethyl orthoformate and (5-50) $\times 10^{-5}$ mol L^{-1} tetranitromethane.	86A155
27.109	**Dimethoxymethyl**							
27.109.1	**Hydrogen peroxide**							
	$^{\bullet}CH(OCH_3)_2 + H_2O_2 \rightarrow$	1×10^6				chem.	Esr study in Ti(III)-H_2O_2 soln. contg. dimethoxymethane; assumed $2k(R + R) = 2 \times 10^9$ L mol^{-1} s^{-1}.	745144

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.109	**Dimethoxymethyl** — Continued							
27.109.2	**Acrylic acid**							
	$^{\bullet}CH(OCH_3)_2 + H_2C{=}CHCO_2H \rightarrow$ addn.	1.5×10^7	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and dimethoxymethane; estimated from an assumed $2k$(R + R).	93D265
27.109.3	**Crotonic acid**							
	$^{\bullet}CH(OCH_3)_2 + CH_3CH{=}CHCO_2H \rightarrow$ addn.	8×10^5	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and dimethoxymethane; estimated from an assumed $2k$(R + R).	93D265
27.109.4	**Methacrylic acid**							
	$^{\bullet}CH(OCH_3)_2 + H_2C{=}C(CH_3)CO_2H \rightarrow$ addn.	2.2×10^7	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and dimethoxymethane; estimated from an assumed $2k$(R + R).	93D265
27.110	**1,1-Dimethoxypropene radical cation**							
27.110.1	**Hydroxide ion**							
	$[(CH_3O)_2C{=}CHCH_3]^{\bullet+} + OH^- \rightarrow$ $CH_3\dot{C}HCO_2CH_3 + MeOH$	2.3×10^8				p.r.	Condy. changes; radical from 2-chloro-1,1-dimethoxypropane.	81D027
27.111	***N,N*-Dimethylacrylamide, radical anion**							
27.111.1	**Water**							
	$[CH_2CHCON(CH_3)_2]^{\bullet-} + H_2O \rightarrow$ $CH_3\dot{C}HCON(CH_3)_2 + OH^-$	$3.7 \times 10^5\ s^{-1}$	10			p.r.	D.k. in soln. contg. *N,N*-dimethylacrylamide and borate buffer.	751052
27.112	**β,β-Dimethylacrylamide, radical anion**							
27.112.1	**Water**							
	$[(CH_3)_2CCHCONH_2]^{\bullet-} + H_2O \rightarrow$ $(CH_3)_2\dot{C}HCONH_2 + OH^-$	$2 \times 10^4\ s^{-1}$	10.2	→0		p.r.	D.k. in soln. contg. β,β-dimethylacrylamide.	751052
27.113	**β,β-Dimethylacrylate, radical anion**							
27.113.1	**Water**							
	$[(CH_3)_2CCHCO_2H]^{\bullet-} + H_2O \rightarrow$ $(CH_3)_2\dot{C}HCO_2^- + H_2O$	$9 \times 10^3\ s^{-1}$	11.0			p.r.	D.k. in soln. contg. β,β-dimethylacrylate; extrapolated to zero concn. of buffer.	761113
27.113.2	**Hydroxide ion**							
	$[(CH_3)_2CCHCO_2H]^{\bullet-} + OH^- \rightarrow$ $(CH_3)_2\dot{C}HCO_2^- + OH^-$	3×10^6	>8.0	→0		p.r.	D.k. in soln. contg. β,β-dimethylacrylate.	761113
27.114	***N*-(Dimethylaminocarbonyl)-*N*-methylaminomethyl**							
27.114.1	**Tetranitromethane**							
	$^{\bullet}CH_2N(CH_3)CON(CH_3)_2 + C(NO_2)_4 \rightarrow$ $^{\bullet}NO_2 + C(NO_2)_3^- +$ *other prod.*	$\sim 7 \times 10^9$				p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. *tetramethylurea.*	84G133
27.115	**2-(Dimethylamino)-1-(dimethylaminomethyl)ethyl, conjugate diacid**							
27.115.1	**2-(Dimethylamino)-1-(dimethylaminomethyl)ethyl, conjugate diacid**							
	$^{\bullet}CH(CH_2NMe_2H^+)_2 +$ $^{\bullet}CH(CH_2NMe_2H^+)_2 \rightarrow$	9.0×10^8	2.2-3.8			p.r.	D.k. in N_2O-satd. soln. contg. 0.05-0.1 mol L^{-1} *N,N,N′,N′*-tetramethyl-1,3-propanediamine; $\varepsilon = 750\ L\ mol^{-1}\ cm^{-1}$ at 370 nm.	93A473
27.115.2	**Copper(I) ion**							
	$^{\bullet}CH(CH_2NMe_2H^+)_2 + Cu^+ \rightarrow$ $CuCH(CH_2NMe_2H^+)_2^+$	4.2×10^8	2.2-3.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.05-0.1 mol L^{-1} *N,N,N′,N′*-tetramethyl-1,3-propanediamine, 0-0.001 mol L^{-1} $CuSO_4$ and $(0.05\text{-}0.13) \times 10^{-3}$ mol L^{-1} Cu^+.	93A473

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.116 Dimethylaminomethyl							
27.116.1 Oxygen							
$^{\bullet}CH_2N(CH_3)_2 + O_2 \rightarrow (CH_3)_2NCH_2OO^{\bullet}$	3.5×10^9	10.4			p.r.	D.k. at 260 nm in N_2O-satd. soln. contg. 10^{-3} mol L^{-1} trimethylamine and (7-14) $\times$ 10^{-5} mol L^{-1} oxygen; products are $O_2^- + (CH_3)_2N^+{=}CH_2$, which may be formed directly by electron transfer, or by decay of a peroxyl radical.	87A128
27.116.2 4-Nitroacetophenone							
$^{\bullet}CH_2N(CH_3)_2 + PNAP \rightarrow [PNAP]^{\bullet-} +$ other prod.	4×10^9	4-11			p.r.	P.b.k. at 365 nm in N_2O-satd. soln. contg. trimethylamine.	86A113
27.117 1,4-Dimethyl-3,6-dioxo-2-piperazinyl							
27.117.1 1,4-Dimethyl-3,6-dioxo-2-piperazinyl							
$\boxed{N(Me)C^{\bullet}OCHN(Me)COCH_2} + \boxed{N(Me)C^{\bullet}OCHN(Me)COCH_2} \rightarrow$	2.3×10^8	5.6			p.r.	D.k. at 350 nm in N_2O-satd. soln. contg. sarcosine anhydride; calcd. from $k_{overall} = 6.0 \times 10^8$ L mol^{-1} s^{-1}.	89A473
27.117.2 4-Methyl-3,6-dioxo-1-piperazinylmethyl							
$\boxed{N(Me)C^{\bullet}OCHN(Me)COCH_2} + \boxed{N(CH_3)COCH_2N(C^{\bullet}H_2)COCH_2} \rightarrow$	5.5×10^8	5.6			p.r.	D.k. at 350 nm in N_2O-satd. soln. contg. sarcosine anhydride; calcd. from $k_{overall} = 6.0 \times 10^8$ L mol^{-1} s^{-1}.	89A473
27.117.3 Ferricyanide ion							
$\boxed{N(Me)C^{\bullet}OCHN(Me)COCH_2} + Fe(CN)_6^{3-} \rightarrow$	4.1×10^8 4.0×10^8 4.1×10^8	3.5 6.5 10.9			p.r.	D.k. at 350 nm in N_2O-satd. soln. contg. sarcosine anhydride.	89A473
27.117.4 Hexachloroiridate(IV) ion							
$\boxed{N(Me)C^{\bullet}OCHN(Me)COCH_2} + IrCl_6^{2-} \rightarrow IrCl_6^{3-} + H^+ +$ other prod.	3.6×10^9	5.7			p.r.	Abs. changes at 250, 350 and 490 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} sarcosine anhydride and (3.8-9.3) $\times$ 10^{-5} mol L^{-1} $IrCl_6^{2-}$; radical mixture includes 20% $-N(C^{\bullet}H_2)COCH_2N(Me)COCH_2-$.	89A464
	3.0×10^9	4			p.r.	Condy changes in N_2O-satd. soln. contg. 0.001 mol L^{-1} sarcosine anhydride.	89A464
27.117.5 Oxygen							
$\boxed{N(Me)C^{\bullet}OCHN(Me)COCH_2} + O_2 \rightarrow \boxed{N(Me)CH(OO^{\bullet})CON(Me)CH_2CO}$	2.0×10^9	6.0, 11.7			p.r.	D.k. at 360 nm in N_2O/O_2 (4:1) satd. soln. contg. sarcosine anhydride.	89A245
	9×10^8	5.2			p.r.	D.k. at 360 nm in N_2O/O_2 satd. soln. contg. sarcosine anhydride.	710554
27.118 2,5-Dimethyl-3,6-dioxo-2-piperazinyl							
27.118.1 2,5-Dimethyl-3,6-dioxo-2-piperazinyl							
$\boxed{NHCOC^{\bullet}(Me)NHCOCH(Me)} + \boxed{NHCOC^{\bullet}(Me)NHCOCH(Me)} \rightarrow$	2.2×10^8 7.5×10^7	6.3 11.8			p.r.	D.k. at 410 nm in N_2O-satd. soln. contg. alanine anhydride.	89A473
27.118.2 Ferricyanide ion							
$\boxed{NHCOC^{\bullet}(Me)NHCOCH(Me)} + Fe(CN)_6^{3-} \rightarrow$	7.9×10^8 8.0×10^8 7.8×10^8	2.8 6.7 9.7			p.r.	D.k. at 360 nm in N_2O-satd. soln. contg. alanine anhydride.	89A473
27.118.3 Hexachloroiridate(IV) ion							
$\boxed{NHCOC^{\bullet}(Me)NHCOCH(Me)} + IrCl_6^{2-} \rightarrow IrCl_6^{3-} + H^+ + \boxed{N{=}C(Me)CONHCH(Me)CO}$	3.0×10^9	5.7			p.r.	Abs. changes at 350 and 360 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} alanine anhydride and (3.8-9.3) $\times$ 10^{-5} mol L^{-1} $IrCl_6^{2-}$.	89A464
27.118.4 Hydroxide ion							
$\boxed{NHCOC^{\bullet}(Me)NHCOCH(Me)} + OH^- \rightarrow \boxed{CONHC^{\bullet}(CH_3)CON^-CH(CH_3)} + H_2O$	$\sim 1.1 \times 10^{10}$	9.2 10.5			p.r.	P.b.k at 300 nm in N_2O-satd. soln. contg. 4×10^{-3} mol L^{-1} alanine anhydride.	710554

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.118	**2,5-Dimethyl-3,6-dioxo-2-piperazinyl** — Continued							
27.118.5	**Oxygen**							
	$\boxed{\text{NHCOC(Me)NHCOCH(Me)}} + O_2 \rightarrow$ $\boxed{\text{NHC(Me)(OO}^{\bullet}\text{)CONHCH(Me)CO}}$	2.3×10^9	6.2			p.r.	D.k. at 360 nm in N_2O/O_2 (4:1) satd. soln. alanine anhydride.	89A245
		2.1×10^9	11.7					
		1.0×10^9	5.4			p.r.	D.k. at 360 nm in N_2O/O_2 satd. soln. alanine anhydride.	710554
		1.1×10^9	12.0					
27.118.6	**2-Methyl-1,4-naphthoquinone**							
	$\boxed{\text{NHCOC(Me)NHCOCH(Me)}} +$ 2-CH_3NQ $\rightarrow$	3.1×10^9	10.9			p.r.	P.b.k. at 395 nm in soln. contg. alanine anhydride, 75% *e*-transfer.	731047
27.119	**2,4-Dimethyl-1,3-dithiolan-2-yl**							
27.119.1	**2,4-Dimethyl-1,3-dithiolan-2-yl**							
	$\boxed{\text{SC(CH}_3\text{)SCH(CH}_3\text{)CH}_2} +$ $\boxed{\text{SC(CH}_3\text{)SCH(CH}_3\text{)CH}_2} \rightarrow$	2.0×10^9	~4			p.r.	D.k. at 315 nm in N_2O-satd. soln. contg. 2,4-dimethyl-1,3-dithiolane; $\varepsilon = 2000\ L\ mol^{-1}\ cm^{-1}$.	86B043
27.120	**1-[Di(1-methylethoxy)methoxy]-1-methylethyl**							
27.120.1	**Ferricyanide ion**							
	$((CH_3)_2CHO)_2CHOC(CH_3)_2 +$ $Fe(CN)_6^{3-} \rightarrow$ $((CH_3)_2CHO)_2CHOC^{+}(CH_3)_2 +$ $Fe(CN)_6^{4-}$	2.7×10^9	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L^{-1} triisopropoxymethane and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $Fe(CN)_6^{3-}$.	86A155
27.120.2	**Hexachloroiridate(IV) ion**							
	$((CH_3)_2CHO)_2CHOC(CH_3)_2 + IrCl_6^{2-}$ $\rightarrow ((CH_3)_2CHO)_2CHOC^{+}(CH_3)_2 +$ $IrCl_6^{3-}$	2.8×10^9	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L^{-1} triisopropoxymethane and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $IrCl_6^{2-}$.	86A155
27.121	**1,1-Dimethylethoxymethyl**							
27.121.1	**Tetranitromethane**							
	$^{\bullet}CH_2OC(CH_3)_3 + C(NO_2)_4 \rightarrow$ $C(NO_2)_3^{-}$ + other prod.	$\sim 3 \times 10^9$				p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. methyl *tert*-butyl ether.	80A071
27.122	**Dimethyl fumarate, radical anion**							
27.122.1	**Oxygen**							
	$[CH_3O_2CCHCHCO_2CH_3]^{\bullet -} + O_2 \rightarrow$	2.2×10^9				p.r.	D.k. in soln. contg. dimethyl fumarate.	730097
		5.3×10^9	11			p.r.	D.k. in soln. contg. dimethyl fumarate.	670729
27.122.2	***N*-Ethylmaleimide**							
	$[CH_3O_2CCHCHCO_2CH_3]^{\bullet -}$ + NEM $\rightarrow$ $NEM^{\bullet -}$ + other prod.	2.2×10^9				p.r.	D.k. in soln. contg. dimethyl fumarate and *N*-ethylmaleimide.	730097
27.123	**2,5-Dioxacyclohexyl**							
27.123.1	**2,5-Dioxacyclohexyl**							
	$\boxed{\text{OCHCH}_2\text{O(CH}_2\text{)}_2} +$ $\boxed{\text{OCHCH}_2\text{O(CH}_2\text{)}_2}$	7.5×10^8			300	p.r.	D.k. at 255 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} dioxane; $\varepsilon = 470\ L\ mol^{-1}\ cm^{-1}$.	86A377
27.123.2	**Hexaamminecobalt(III) ion**							
	$\boxed{\text{OCHCH}_2\text{O(CH}_2\text{)}_2} + Co(NH_3)_6^{3+} \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. dioxane.	771100
27.123.3	**Pentaammine(bromo)cobalt(III) ion**							
	$\boxed{\text{OCHCH}_2\text{O(CH}_2\text{)}_2} + Co(NH_3)_5Br^{2+} \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. dioxane.	771100
27.123.4	**Pentaammine(chloro)cobalt(III) ion**							
	$\boxed{\text{OCHCH}_2\text{O(CH}_2\text{)}_2} + Co(NH_3)_5Cl^{2+} \rightarrow$	$\leq 2 \times 10^6$	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. dioxane.	771100
27.123.5	***trans*-Dibromobis(ethylenediamine)cobalt(III) ion**							
	$\boxed{\text{OCHCH}_2\text{O(CH}_2\text{)}_2} + Co(en)_2Br_2^{+} \rightarrow$	4.4×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. dioxane.	771100
27.123.6	**Bis(ethylenediamine)dichlorocobalt(III) ion**							
	$\boxed{\text{OCHCH}_2\text{O(CH}_2\text{)}_2} + Co(en)_2Cl_2^{+} \rightarrow$	3.5×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. dioxane.	771100

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.123	**2,5-Dioxacyclohexyl** — Continued							
27.123.7	**Chromium(II) ion**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + Cr^{2+} → addn.	1.0×10^8	~ 1			p.r.	P.b.k. in Ar-satd. soln. contg. dioxane and $HClO_4$.	741146
27.123.8	**Copper(II) ion**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + Cu^{2+} →	4.0×10^6	0.5-4.0			p.r.	Calcd. from first-order d.k. at 390 nm (decomp. of $Cu^{II}CHCH_2OCH_2CH_2O$-) dependence on $[Cu^+]$ and $[Cu^{2+}]$	87A225
27.123.9	**Hexachloroiridate(IV) ion**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + $IrCl_6^{2-}$ → $IrCl_6^{3-}$ + other prod.	5.4×10^9	4-6			p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. dioxane.	82A041
27.123.10	**Permanganate ion**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + MnO_4^- →	6.5×10^9	4-6			p.r.	D.k. at 545 nm in N_2O-satd. soln. contg. dioxane.	82A041
27.123.11	**Hydrogen peroxide**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + H_2O_2 →	3×10^4				chem.	Esr study in Ti(III)-H_2O_2 soln. contg. dioxane and *tert*-BuOH; assumed $2k(R + R) = 2 \times 10^9$ $L\ mol^{-1}\ s^{-1}$.	745144
27.123.12	**Hexaammineruthenium(III) ion**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + $Ru(NH_3)_6^{3+}$ →	5.0×10^6	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} dioxane.	771100
27.123.13	**Pentaammine(bromo)ruthenium(III) ion**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + $Ru(NH_3)_5Br^{2+}$ →	2.7×10^8	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} dioxane.	771100
27.123.14	**Pentaammine(chloro)ruthenium(III) ion**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + $Ru(NH_3)_5Cl^{2+}$ →	8.3×10^7	3.5-4			p.r.	D.k. in N_2O-satd. soln. contg. 0.5-1 mol L^{-1} dioxane.	771100
27.123.15	**Nitrobenzene**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + $C_6H_5NO_2$ →	2.5×10^7				p.r.	D.k.; radical from dioxane.	771100
27.123.16	**Thionine cation**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + Th^+ → $[ThH]^{\cdot+}$ + other prod.	2.7×10^9	6.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} dioxane and 10^{-4} mol L^{-1} thionine.	87A451
27.123.17	**Toluidine Blue cation**							
	$\boxed{\dot{O}CHCH_2O(CH_2)_2}$ + TB^+ → $[TBH]^{\cdot+}$ + other prod.	2.6×10^9	6.8			p.r.	P.b.k. at 830 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} dioxane.	89A262
27.124	**2,5-Dioxacyclopentyl**							
27.124.1	**Hydrogen peroxide**							
	$\boxed{\dot{O}CHO(CH_2)_2}$ + H_2O_2 →	$\geq 6 \times 10^4$				chem.	Esr study in Ti(III)-H_2O_2 soln. contg. dioxolane; used $2k(R + R) = 3 \times 10^9$ $L\ mol^{-1}\ s^{-1}$.	745144
27.125	**1,3-Dioxolan-4-yl**							
27.125.1	**Dithiothreitol**							
	$\boxed{OCH_2OCH_2\dot{C}H}$ + $HSCH_2(CHOH)_2CH_2SH$ → $HSCH_2(CHOH)_2CH_2S^{\cdot}$ + $\boxed{OCH_2O(CH_2)_2}$	1.0×10^8	8.0		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N_2O-satd. soln. contg. DTT and dioxolane; radical mixture.	87G007
27.126	**1,3-Dioxan-4-yl**							
27.126.1	**Dithiothreitol**							
	$\boxed{OCH_2OCH_2CH_2\dot{C}H}$ + $HSCH_2(CHOH)_2CH_2SH$ → $HSCH_2(CHOH)_2CH_2S^{\cdot}$ + dioxane	1.2×10^8	8.0		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N_2O-satd. soln. contg. DTT and 1,3-dioxane; radical mixture.	87G007

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.127	**3,6-Dioxo-2-piperazinyl**							
27.127.1	**3,6-Dioxo-2-piperazinyl**							
	$[CH_2CONHCHCONH] + [CH_2CONHCHCONH] \rightarrow$	3.5×10^8 1.4×10^8	6.2 11.7			p.r.	D.k. at 440 nm in N_2O-satd. soln. contg. glycine anhydride.	89A473
27.127.2	**Ferricyanide ion**							
	$[CH_2CONHCHCONH] + Fe(CN)_6^{3-} \rightarrow$	1.0×10^8 3.1×10^8	6.4 11.3			p.r.	D.k. at 350 nm in N_2O-satd. soln. contg. glycine anhydride.	89A473
27.127.3	**Hexachloroiridate(IV) ion**							
	$[CH_2CONHCHCONH] + IrCl_6^{2-} \rightarrow IrCl_6^{3-} + H^+ + [N{=}CHCONHCH_2CO]$	3.1×10^9	5.7			p.r.	Abs. changes at 250 and 270 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} glycine anhydride and $(3.8\text{-}9.3) \times 10^{-5}$ mol L^{-1} $IrCl_6^{2-}$.	89A464
27.127.4	**Hydroxide ion**							
	$[CH_2CONHCHCONH] + OH^- \rightarrow H_2O + [CONHCHCON^-CH_2]$	$\sim 8 \times 10^9$	~9.2-10.5			p.r.	P.b.k at 300 nm in N_2O-satd. soln. contg. 4×10^{-3} mol L^{-1} glycine anhydride.	710554
27.127.5	**Oxygen**							
	$[CH_2CONHCHCONH] + O_2 \rightarrow [NHCH(OO^{\cdot})CONHCH_2CO]$	2.0×10^9	6.5-11.7		293	p.r.	D.k. at 360 nm in N_2O/O_2 (4:1) satd. soln. contg. glycine anhydride.	89A245
		1.2×10^9 2.8×10^8	5.0 12.0			p.r.	D.k. at 360 nm in N_2O/O_2 satd. soln. contg. glycine anhydride.	710554
27.127.6	**1,4-Benzoquinone**							
	$[CH_2CONHCHCONH] + Q \rightarrow [CH_2CONHCH_2CONH] + Q^{\cdot-}$	2.2×10^9	10.5			p.r.	P.b.k. in N_2O-satd. soln. contg. glycine anhydride; 87% *e*-transfer.	731052
27.127.7	**Cysteine**							
	$[CH_2CONHCHCONH] + CysSH \rightarrow$	$<10^7$	6,10, 12			p.r.	No change in d.k. at 265 nm on addn. of cysteine in N_2O-satd. soln. contg. glycine anhydride.	710554
27.127.8	**2-Methyl-1,4-naphthoquinone**							
	$[CH_2CONHCHCONH] + 2\text{-}CH_3NQ \rightarrow [2\text{-}CH_3NQ]^{\cdot-}$ + other prod.	4.0×10^9	10.9			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycine anhydride; 88% *e*-transfer; no *e*-transfer at pH 6.7.	731047
		5.0×10^9	10.9			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. glycine anhydride; 85% *e*-transfer; no *e*-transfer at pH 7.0.	723057
27.127.9	**Cytochrome C**							
	$[CH_2CONHCHCONH] + Cyt\ C\ (Fe^{3+}) \rightarrow$	$<10^7$	6.8			p.r.	P.b.k. at 550 nm in N_2O-satd. soln. contg. glycine anhydride.	78A288
27.128	**1,3-Dithiolan-2-yl**							
27.128.1	**Tetranitromethane**							
	$[SCHS(CH_2)_2] + C(NO_2)_4 \rightarrow {}^{\cdot}NO_2 + C(NO_2)_3^- +$ other prod.	4.3×10^9	~4			p.r.	D.k. as well as p.b.k. at 350 nm in N_2O-satd. soln. contg. 1,3 dithiolane; mixt. of radicals.	86B043
27.129	**1-Ethoxy-1-methoxyethene radical cation**							
27.129.1	**Hydroxide ion**							
	$[(C_2H_5O)(CH_3O)C{=}CH_2]^{\cdot+} + OH^- \rightarrow {}^{\cdot}CH_2CO_2CH_3 + {}^{\cdot}CH_2CO_2C_2H_5 + EtOH + MeOH$	3.0×10^9				p.r.	Condy. changes; radical from 2-chloro-1-ethoxy-1-methoxyethane.	81D027
27.130	**Ethylenediaminetetraacetate radical**							
27.130.1	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$[EDTA_{ox}]^{\cdot} + MV^{2+} \rightarrow MV^{\cdot+} + EDTA$	5.9×10^5 1.5×10^9	4.7 8.7, 11			f.p./rq	P.b.k. at 395 and 605 nm in soln. contg. $Ru(bpz)_3^{2+}$, EDTA and MV^{2+}. Reaction follows quenching of $*[Ru(bpz)_3^{2+}]$ by EDTA followed by deprotonation.	89E105

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
27.130	**Ethylenediaminetetraacetate radical** — Continued							
27.130.1	**1,1′-Dimethyl-4,4′-bipyridinium** — Continued							
		8.5×10^6 7.6×10^8 2.8×10^9	4.7 8.3 12.5			p.r.	P.b.k. at 602 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} EDTA and (0.1-1) $\times 10^{-3}$ mol L^{-1} methyl viologen.	85A051
27.130.2	**Flavine mononucleotide**							
	$[EDTA_{ox}]^{\cdot}$ + FMN + H^+ → FMNH$^{\cdot}$ + EDTA	5×10^8	7.0			p.r.	P.b.k. in N_2O-satd. soln. contg. FMN and EDTA.	81A115
27.130.3	**Lumiflavine**							
	$[EDTA_{ox}]^{\cdot}$ + LF + H^+ → LFH$^{\cdot}$ + EDTA	1.5×10^9	7			p.r.	P.b.k. at 500 nm in N_2O-satd. soln. contg. EDTA.	85A224
27.130.4	**Cytochrome C**							
	$[EDTA_{ox}]^{\cdot}$ + Cyt C (Fe^{3+}) →	2×10^8	7.0			p.r.	P.b.k.; biphasic, $k = 2 \times 10^7$ L mol^{-1} s^{-1}; indicates two reducing radicals from EDTA.	81A115
27.131	**2-(Ethylidene)-1,3-dioxolane radical cation**							
27.131.1	**Hydroxide ion**							
	$[\overline{(CH_2)_2OC(=CHCH_3)O}]^{\cdot+}$ + OH^- → $CH_3\dot{C}HCO_2CH_2CH_2OH$	7.0×10^8				p.r.	Condy. changes, radical from 2-(1-chloroethyl)-1,3-dioxolane.	81D027
27.132	**4-(Ethylthio)butyl**							
27.132.1	**1,4-Benzoquinone**							
	$C_2H_5S(CH_2)_3\dot{C}H_2$ + Q → addn.	4.1×10^8	6			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} *tert*-BuOH and 0.1 mol L^{-1} 1-ethylthiolanium.	91A184
27.133	**1-(Ethylthio)ethyl**							
27.133.1	**Tetranitromethane**							
	$CH_3\dot{C}HSC_2H_5$ + $C(NO_2)_4$ → addn.	3.3×10^9	3.5		294	p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. diethyl sulfide.	84A087
27.134	**1-Ethyl-2-trimethylammonioethyl**							
27.134.1	**Ferricyanide ion**							
	$CH_3CH_2\dot{C}HCH_2N^+(CH_3)_3$ + $Fe(CN)_6^{3-}$ → $Fe(CN)_6^{4-}$ + other prod.	3.6×10^9				p.r.	D.k. at 404 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} butyltrimethylammonium and 5×10^{-5} mol L^{-1} ferricyanide; k for β- and γ-radicals, slower reaction with δ-radicals.	84A385
27.135	**1-Formylethyl**							
27.135.1	**Hydroquinone monoanion**							
	$CH_3\dot{C}HCHO$ + 4-$HOC_6H_4O^-$ →	1.2×10^9	~11.5			p.r.	P.b.k. at 430 nm (semiquinone) in N_2O-satd. soln. contg. 1,2-propanediol; radical mixture also contains $CH_3CO\dot{C}H_2$.	79A051
27.136	**1-Formyl-4-hydroxybutyl**							
27.136.1	**Hydroquinone monoanion**							
	$HO(CH_2)_3\dot{C}HCHO$ + 4-$HOC_6H_4O^-$ →	8.6×10^8	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 2-(hydroxymethyl)tetrahydrofuran.	79A051
27.137	**1-Formyl-2-hydroxyethyl**							
27.137.1	**Hydroquinone monoanion**							
	$HOCH_2\dot{C}HCHO$ + 4-$HOC_6H_4O^-$ →	1.7×10^9	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. $HOCH_2CH(OPO_3^{2-})CH_2OH$; radical also obtained from glycerol, $k = 1.5 \times 10^9$, and 2,3-epoxypropanol, $k = 1.3 \times 10^9$ L mol^{-1} s^{-1}.	79A051

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.138	**1-Formyl-5-hydroxypentyl**							
27.138.1	**Hydroquinone monoanion**							
	$HO(CH_2)_4\dot{C}HCHO + 4\text{-}HOC_6H_4O^- \rightarrow$	5.2×10^8	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 2-(hydroxymethyl)tetrahydropyran.	79A051
27.139	**(*N*-Formyl-*N*-methylamino)methyl**							
27.139.1	**Hexaamminecobalt(III) ion**							
	$^{\bullet}CH_2N(CH_3)CHO + Co(NH_3)_6^{3+} \rightarrow$	$<1.0 \times 10^7$	6.0			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} dimethylformamide.	72A018
27.139.2	**Chromium(II) ion**							
	$^{\bullet}CH_2N(CH_3)CHO + Cr^{2+} \rightarrow$ $ClCH_2N(CH_3)CHO^{2+}$	1.1×10^8	~5			p.r.	P.b.k. in Ar or N_2O-satd. soln. contg. dimethylformamide.	741146
27.139.3	**Hexaammineruthenium(III) ion**							
	$^{\bullet}CH_2N(CH_3)CHO + Ru(NH_3)_6^{3+} \rightarrow$	$<3.0 \times 10^7$	6.0			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} dimethylformamide; *e* transfer.	72A018
27.140	**Glycine anhydride, radical anion**							
27.140.1	**Acetophenone**							
	$[\overline{NHCOCH_2NHCOCH_2}]^{\bullet -} + C_6H_5COCH_3 \rightarrow$ $\overline{CH_2CONHCH_2CONH}$ + $C_6H_5\dot{C}O^-CH_3$	2.3×10^9 2.0×10^9	5.2 12.3			p.r.	P.b.k. at 280 nm (320 at pH 12.3) in soln. contg. glycine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.140.2	**Benzophenone**							
	$[\overline{NHCOCH_2NHCOCH_2}]^{\bullet -} + (C_6H_5)_2CO \rightarrow$ $\overline{CH_2CONHCH_2CONH}$ + $(C_6H_5)_2\dot{C}O^-$	2.2×10^9 2.5×10^9	5.5 12.3			p.r	P.b.k. at 330 nm (320 at pH 12.3) in soln. contg. glycine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.140.3	**Cystamine**							
	$[\overline{NHCOCH_2NHCOCH_2}]^{\bullet -} + [H_2NCH_2CH_2S]_2 \rightarrow$ electron transfer	1.2×10^8	5.7, 11.0			p.r.	D.k. at 265 nm (R) in soln. contg. glycine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.140.4	**Cysteine**							
	$[\overline{NHCOCH_2NHCOCH_2}]^{\bullet -} + CysSH \rightarrow$	2.1×10^8	6.4			p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH and glycine anhydride.	710554
27.140.5	**Glutathione**							
	$[\overline{NHCOCH_2NHCOCH_2}]^{\bullet -} + GSH \rightarrow$ electron transfer	1.8×10^8	6.4, 7.4			p.r.	D.k. at 265 nm in soln. contg. glycine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.140.6	**Glutathione, oxidized**							
	$[\overline{NHCOCH_2NHCOCH_2}]^{\bullet -} + GSSG \rightarrow GSSG^{\bullet -}$ + other prod.	4.0×10^7	6.2			p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH and glycine anhydride.	710554
27.140.7	**3-Mercaptopropionate ion**							
	$[\overline{NHCOCH_2NHCOCH_2}]^{\bullet -} + HSCH_2CH_2CO_2^- \rightarrow$ electron transfer	3.0×10^8	5.3, 7.4			p.r.	D.k. at 265 nm in soln. contg. glycine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.140.8	**2-Methyl-1,4-naphthoquinone**							
	$[\overline{NHCOCH_2NHCOCH_2}]^{\bullet -} + 2\text{-}CH_3NQ \rightarrow [2\text{-}CH_3NQ]^{\bullet -}$ + other prod.	4.9×10^9	6.9			p.r.	P.b.k. at 395 nm in soln. contg. glycine anhydride; 98% *e*-transfer.	731047
27.140.9	**Cytochrome C**							
	$[\overline{NHCOCH_2NHCOCH_2}]^{\bullet -} + Cyt\ C\ (Fe^{3+}) \rightarrow$	8×10^8	6.8			p.r.	P.b.k. at 500 nm in soln. contg. glycine anhydride.	78A288
27.141	**1-Hydroxy-2-butenyl**							
27.141.1	**Nifuroxime**							
	$CH_3CH{=}CH\dot{C}HOH + NF \rightarrow$	5.6×10^9	7			p.r.	P.b.k. at 390 nm (NF^-) in N_2O-satd. soln. contg. crotyl alcohol; 24% *e*-transfer.	731099

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.141	**1-Hydroxy-2-butenyl** — Continued							
	27.141.1 Nifuroxime — Continued							
		2.4×10^9	7			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. crotyl alcohol; 10% *e*-transfer.	731062
	27.141.2 4-Nitroacetophenone							
	$CH_3CH{=}CH\dot{C}HOH + PNAP \rightarrow$	2.0×10^9	7			p.r.	P.b.k. at 360 and 550 nm ($PNAP^-$) in N_2O-satd. soln. contg. crotyl alcohol; 9% *e*-transfer.	731062
	27.141.3 Nitrobenzene							
	$CH_3CH{=}CH\dot{C}HOH + C_6H_5NO_2 \rightarrow$	$\sim 1 \times 10^9$	7			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. crotyl alcohol; 8% *e*-transfer.	731062
27.142	**1-Hydroxybutyl**							
	27.142.1 Ethylenediaminetetraacetatocuprate(I) ion							
	$CH_3(CH_2)_2\dot{C}HOH + CuEDTA^{3-} \rightarrow CH_3(CH_2)_2CHOHCuEDTA^{3-}$	$\sim 5 \times 10^9$	7.5			p.r.	P.b.k. at 440 nm in soln. contg. 0.01 mol L^{-1} $CuEDTA^{2-}$ and 0.06 mol L^{-1} 1-BuOH. Value obtained from computer fit.	80A153
	27.142.2 Ethylenediaminetetraacetatocuprate(II) ion							
	$CH_3(CH_2)_2\dot{C}HOH + CuEDTA^{2-} \rightarrow$	$\sim 1 \times 10^6$	7.5			p.r.	P.b.k. at 440 nm in soln. contg. $CuEDTA^{2-}$ and 1-BuOH. Value obtained from computer fit.	80A153
	27.142.3 Cysteamine, conjugate acid							
	$CH_3(CH_2)_2\dot{C}HOH + HSCH_2CH_2NH_3^+ \rightarrow$ 1-BuOH + $H_3N^+CH_2CH_2S^\bullet$	8.2×10^7				p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O- satd. soln. contg. 1-BuOH.	680132
	27.142.4 2-Methyl-1,4-naphthoquinone							
	$CH_3(CH_2)_2\dot{C}HOH + 2\text{-}CH_3NQ \rightarrow$	4.1×10^9 4.2×10^9	7.0 12.7			p.r.	P.b.k. in soln. contg. 0.05 mol L^{-1} 1-BuOH; 32.3% (pH 7) and 40% (pH 12.7) *e*-transfer.	731047
	27.142.5 Nifuroxime							
	$CH_3(CH_2)_2\dot{C}HOH + NF \rightarrow$	5.1×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 1-BuOH; 75% *e*-transfer.	731099
		3.4×10^9	7			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. 1-BuOH; 32% *e*-transfer.	731062
	27.142.6 4-Nitroacetophenone							
	$CH_3(CH_2)_2\dot{C}HOH + PNAP \rightarrow$	2.2×10^9	7			p.r.	P.b.k. at 360 and 550 nm in N_2O-satd. soln contg. 1-BuOH; 24% *e*-transfer.	731062
	27.142.7 Nitrobenzene							
	$CH_3(CH_2)_2\dot{C}HOH + C_6H_5NO_2 \rightarrow$	1.1×10^9	7			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. 1-BuOH; 31% *e*-transfer.	731062
		4.0×10^8	7			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1-BuOH; 35% *e*-transfer.	660432
	27.142.8 Nitrosobenzene							
	$CH_3(CH_2)_2\dot{C}HOH + C_6H_5NO \rightarrow CH_3CH_2CH_2CHO + C_6H_5\dot{N}OH$	4.0×10^9	7.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 1-BuOH; includes β- and γ-alcohol radical reaction.	660433
27.143	**1-Hydroxybutyl, conjugate base**							
	27.143.1 1-Amino-4-anilino-9,10-anthraquinone-2-sulfonate ion							
	$CH_3CH_2CH_2\dot{C}HO^- + ABSBR \rightarrow CH_3CH_2CH_2CHO + ABSBR^{\bullet -}$	2.4×10^9	11.8			p.r.	P.b.k. in Ar-satd. soln. contg. 0.2 mol L^{-1} 1-BuOH; ε(500) = 6800 L mol^{-1} cm^{-1}.	89A043
	27.143.2 Nitrobenzene							
	$CH_3CH_2CH_2\dot{C}HO^- + C_6H_5NO_2 \rightarrow CH_3CH_2CH_2CHO + [C_6H_5NO_2]^{\bullet -}$	3.1×10^9	13			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 1-BuOH.	660432

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
27.144	**1-Hydroxycyclobutyl**							
27.144.1	**Ferricyanide ion**							
	$\dot{C}H_2COH(CH_2)_2$ + $Fe(CN)_6^{3-}$ → $(CH_2)_3CO$ + $Fe(CN)_6^{4-}$ + H^+	2.6×10^9 5.3×10^9	7		275 337	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cyclobutanone and 0.1 mol L^{-1} *tert*-BuOH; E_a = 8.8 kJ mol^{-1}.	761103
27.144.2	**Nitrobenzene**							
	$\dot{C}H_2COH(CH_2)_2$ + $C_6H_5NO_2$ → H^+ + $[C_6H_5NO_2]^{\cdot-}$ + $(CH_2)_3CO$	1.5×10^9 3.2×10^9			275 337	p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclobutanone and 0.1 mol L^{-1} *tert*-BuOH; E_a = 9.6 kJ mol^{-1}.	761103
27.145	**1-Hydroxycyclopentyl**							
27.145.1	**Ferricyanide ion**							
	$\dot{C}H_2COH(CH_2)_3$ + $Fe(CN)_6^{3-}$ → $(CH_2)_4CO$ + $Fe(CN)_6^{4-}$ + H^+	2.3×10^9 5.4×10^9	7		275 337	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cyclopentanone and 0.1 mol L^{-1} *tert*-BuOH; E_a = 10.9 kJ mol^{-1}.	761103
27.145.2	**Nitrobenzene**							
	$\dot{C}H_2COH(CH_2)_3$ + $C_6H_5NO_2$ → $[C_6H_5NO_2]^{\cdot-}$ + $(CH_2)_4CO$	1.4×10^9 5.2×10^9			275 337	p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclopentanone and 0.1 mol L^{-1} *tert*-BuOH; E_a = 16.8 kJ mol^{-1}.	761103
27.146	**1-Hydroxycycloheptyl**							
27.146.1	**Ferricyanide ion**							
	$\dot{C}H_2COH(CH_2)_5$ + $Fe(CN)_6^{3-}$ → $(CH_2)_6CO$ + $Fe(CN)_6^{4-}$ + H^+	2.1×10^9 5.4×10^9	7		275 337	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cycloheptanone and 0.1 mol L^{-1} *tert*-BuOH E_a = 11.7 kJ mol^{-1}.	761103
27.146.2	**Nitrobenzene**							
	$\dot{C}H_2COH(CH_2)_5$ + $C_6H_5NO_2$ → $[C_6H_5NO_2]^{\cdot-}$ + $(CH_2)_6CO$	1.4×10^9 4.9×10^9			275 337	p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cycloheptanone and 0.1 mol L^{-1} *tert*-BuOH. E_a = 15.9 kJ mol^{-1}.	761103
27.147	**1-Hydroxycyclohexyl**							
27.147.1	**Ferricyanide ion**							
	$\dot{C}H_2COH(CH_2)_4$ + $Fe(CN)_6^{3-}$ → *c*-$C_6H_{10}(=O)$ + $Fe(CN)_6^{4-}$	1.0×10^9				p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. cyclohexanol.	79N061
		1.8×10^9 5.0×10^9	7		275 337	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cyclohexanone and 0.1 mol L^{-1} *tert*-BuOH E_a = 12.1 kJ mol^{-1}.	761103
27.147.2	**Nitrobenzene**							
	$\dot{C}H_2COH(CH_2)_4$ + $C_6H_5NO_2$ → $[C_6H_5NO_2]^{\cdot-}$ + *c*-$C_6H_{10}(=O)$	7×10^8 2.0×10^9			275 337	p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclohexanone and 0.1 mol L^{-1} *tert*-BuOH. E_a = 13 kJ mol^{-1}.	761103
27.148	**2-Hydroxycyclohexyl**							
27.148.1	**Copper(II) ion**							
	$\dot{C}HCHOH(CH_2)_4$ + Cu^{2+} →	$\leq1\times10^7$	1-5.5			p.r.	P.b.k. in N_2O-satd. soln. contg. (5-50) × 10^{-4} mol L^{-1} $CuSO_4$, (0-1) × 10^{-4} mol L^{-1} Cu^+, 0.15 mol L^{-1} cyclohexene, 0.5 mol L^{-1} acetonitrile and chromium(III).	91A152
27.148.2	**Copper(I) ion, complex with cyclohexene**							
	$\dot{C}HCHOH(CH_2)_4$ + Cu(cyclohexene)$^+$ → *c*-C_6H_{10} + $CuCHCH(OH)(CH_2)_4^+$	2.6×10^9	1-5.5			p.r.	P.b.k. in N_2O-satd. soln. contg. (5-20) × 10^{-4} mol L^{-1} $CuSO_4$, (5-40) × 10^{-5} mol L^{-1} Cu^+, (5-40) × 10^{-5} mol L^{-1} Cr(III), 0.02-0.15 mol L^{-1} cyclohexene and 0.15-0.65 mol L^{-1} acetonitrile.	91A152

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.149	**1-Hydroxycyclooctyl**							
27.149.1	**Ferricyanide ion**							
	$\boxed{CH_2\dot{C}OH(CH_2)_6}$ + $Fe(CN)_6^{3-}$ → $\boxed{(CH_2)_7CO}$ + $Fe(CN)_6^{4-}$ + H^+	2.2×10^9 5.4×10^9	7		275 337	p.r.	D.k. at 410 nm in soln. contg. 10^{-3} mol L^{-1} cyclooctanone and 0.1 mol L^{-1} *tert*-BuOH E_a = 11.7 kJ mol^{-1}.	761103
27.149.2	**Nitrobenzene**							
	$\boxed{CH_2\dot{C}OH(CH_2)_6}$ + $C_6H_5NO_2$ → $[C_6H_5NO_2]^{\cdot-}$ + $\boxed{(CH_2)_7CO}$	1.6×10^9 5.2×10^9			275 338	p.r.	P.b.k. at 280 nm in soln. contg. 10^{-3} mol L^{-1} cyclooctanone and 0.1 mol L^{-1} *tert*-BuOH. E_a = 15.5 kJ mol^{-1}.	761103
27.150	**1-Hydroxy-2-[*N*,*N*-di(2-hydroxyethyl)amino]ethyl**							
27.150.1	**First-order reaction**							
	$(HOCH_2CH_2)_2NCH_2\dot{C}HOH$ → $(HOCH_2CH_2)_2NCHOH\dot{C}H_2$	$2.3 \times 10^5\ s^{-1}$	8.0-9.5		298	p.r.	P.b.k. at 230 and 410 nm as well as d.k. at 270 nm in soln. contg. triethanolamine; E_a = 33 kJ mol^{-1}, studied at 283-328 K, log A = 11.079.	82G071
27.151	**2-Hydroxy-1-[di(2-hydroxyethyl)amino]ethyl**							
27.151.1	**Tris(2,2′-bipyrazine)ruthenium(II) ion**							
	$HOCH_2\dot{C}HN(CH_2CH_2OH)_2$ + $Ru(bpz)_3^{2+}$ → $Ru(bpz)_3^{+}$ + other prod.	1.2×10^9	12			f.p./rq	P.b.k. at 490 nm in soln. contg. $Ru(bpz)_3^{2+}$ and triethanolamine; reaction follows quenching of $*[Ru(bpz)_3^{2+}]$ by TEOA followed by deprotonation.	89E105
27.151.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$HOCH_2\dot{C}HN(CH_2CH_2OH)_2 + MV^{2+}$ → $MV^{\cdot+}$ + other prod.	2.7×10^9	12			f.p./rq	P.b.k. at 605 nm in soln. contg. $Ru(bpz)_3^{2+}$, triethanolamine and MV^{2+}; reaction follows quenching of $*[Ru(bpz)_3^{2+}]$ by TEOA followed by deprotonation.	89E105
27.152	**2-Hydroxy-2-[*N*,*N*-di(2-hydroxyethyl)amino]ethyl**							
27.152.1	**2-Hydroxy-2-[*N*,*N*-di(2-hydroxyethyl)amino]ethyl**							
	$(HOCH_2CH_2)_2NCHOH\dot{C}H_2$ + $(HOCH_2CH_2)_2NCHOH\dot{C}H_2$ →	1.3×10^8	8			p.r.	D.k. at 230 nm or 410 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} TEOA.	82G071
27.152.2	**Triethanolamine**							
	$(HOCH_2CH_2)_2NCHOH\dot{C}H_2$ + TEOA → $HOCH_2\dot{C}HN(CH_2CH_2OH)_2$ + $(HOCH_2CH_2)_2NCHOHCH_3$	5×10^4	~8			γ-r.	Chain reaction; calcd. from intensity and pH dependence of products and $k = 2.5 \times 10^8$ L $mol^{-1}\ s^{-1}$ for radical decay in N_2O-satd. soln. contg. TEOA.	82G071
27.153	**2-Hydroxyethenyl**							
27.153.1	**2-Hydroxyethenyl**							
	HOCH=CH· + HOCH=CH· → HOCH=CHCH=CHOH	3.2×10^9	<7			p.r.	P.b.k. at 240 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} acetylene; $\varepsilon = 8.1 \times 10^3$ L $mol^{-1}\ cm^{-1}$; $2k/\varepsilon = 2.0 \times 10^5$ cm s^{-1}; product rearranges to succinaldehyde.	78A007
27.153.2	**Hydroxide ion**							
	HOCH=CH· + OH^- → [·CH=CHO$^-$] + H_2O	1.5×10^{10}	9.4-10			p.r.	D.k. at 260 nm in 10^{-3} mol L^{-1} acetylene soln.; hydrolysis product is formylmethyl radical.	78A007
27.153.3	**Oxygen**							
	HOCH=CH· + O_2 → HOCH=CHOO·	1.0×10^9				p.r.	Condy. buildup in soln. contg. N_2O/O_2 and acetylene.	81A371

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.153	**2-Hydroxyethenyl** — Continued							
27.153.4	**Acetylene**							
	$HOCH{=}CH^{\bullet} + HC{\equiv}CH \rightarrow HOCH{=}CHCH{=}\dot{C}H$	8.8×10^6	4.0, 6.0		298	p.r.	P.b.k. at 290 nm in N_2O-satd. soln. contg. acetylene; product thought to be hydroxybutadienyl which reacts to give hydroxyhexatrienyl (p.b.k. at 260 nm, $k = 5 \times 10^6$ $L\ mol^{-1}\ s^{-1}$); $E_a = 25$ kJ mol^{-1}, studied at 278-333 K.	78A007
27.154	**1-(2-Hydroxyethylcarbonyl)ethyl**							
27.154.1	**1-(2-Hydroxyethylcarbonyl)ethyl**							
	$CH_3\dot{C}HCO_2CH_2CH_2OH + CH_3\dot{C}HCO_2CH_2CH_2OH \rightarrow$	5×10^8				p.r.	D.k. in He-satd. soln. contg. 0.5 mol L^{-1} *tert*-BuOH and 2-hydroxyethyl acrylate.	93A106
27.155	**2-Hydroxy-1-(2-hydroxyethoxy)carbonylethyl**							
27.155.1	**2-Hydroxy-1-(2-hydroxyethoxy)carbonylethyl**							
	$HOCH_2\dot{C}HCO_2CH_2CH_2OH + HOCH_2\dot{C}HCO_2CH_2CH_2OH \rightarrow$	6×10^8				p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. 2-hydroxyethyl acrylate; $pK_a = 7.8$.	93A106
27.156	**3-Hydroxy-1-(hydroxymethyl)-2-oxopropyl**							
27.156.1	**Hydroquinone monoanion**							
	$HOCH_2\dot{C}HCOCH_2OH + 4\text{-}HOC_6H_4O^- \rightarrow$	1.3×10^9	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. *meso*-erythritol; 2-alkanonyl radical mixture formed by H-abstraction from erythritol and dehydration.	79A051
27.157	**1-Hydroxy-2-methoxyethyl**							
27.157.1	**Hydrogen ion**							
	$CH_3OCH_2\dot{C}HOH + H^+ \rightarrow {}^{\bullet}CH_2CHO + MeOH + H^+$	4.9×10^5				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-methoxyethanol at varied $[H^+]$; acid catalysis.	86A220
27.158	**2-Hydroxy-1-methylethyl**							
27.158.1	**3,10,17,24-Tetrasulfophthalocyaninecobaltate(II) ion**							
	$CH_3\dot{C}HCH_2OH + Co(tspc)^{4-} \rightarrow HOCH_2CH(CH_3)Co(tspc)^{4-}$	1.5×10^9	6.1			p.r.	P.b.k.	89A150
27.158.2	**Chromium(II) ion**							
	$CH_3\dot{C}HCH_2OH + Cr^{2+} \rightarrow CrCH(CH_3)CH_2OH^{2+}$	1.1×10^8	~3		293	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and propylene; $\Delta V‡ = 3.9$ cm^3 mol^{-1}, studied at 0.1-150 MPa.	92A361
		1.5×10^8	0-5			p.r.	P.b.k. in soln. satd. with propylene/N_2O, contg. $(1\text{-}20) \times 10^{-4}$ mol L^{-1} Cr^{2+}.	91A477
27.158.3	**Iron(II) protoporphyrin**							
	$CH_3\dot{C}HCH_2OH + Fe(II)PP \rightarrow HOCH_2C(CH_3)Fe(III)PP$	5×10^8	10-13			p.r.	P.b.k. in soln. satd. with N_2O/propylene (1:9) contg. $(1\text{-}3) \times 10^{-5}$ mol L^{-1} Fe(II)PP.	86A511
27.159	**1-Hydroxymethyl-2-oxopropyl**							
27.159.1	**Thionine cation**							
	$HOCH_2\dot{C}HCOCH_3 + Th^+ \rightarrow H_2C{=}CHCOCH_3 + [ThH]^{\bullet+}$	7×10^9	6.8			p.r.	P.b.k. at 770 nm in N_2O-satd. soln. contg. 4×10^{-3} mol L^{-1} methyl vinyl ketone and 1×10^{-5} mol L^{-1} thionine.	90A306
27.160	**1-Hydroxy-1-methyl-2-oxopropyl**							
27.160.1	**Hexaamminecobalt(III) ion**							
	$CH_3\dot{C}OHCOCH_3 + Co(NH_3)_6^{3+} \rightarrow$	$<2.0 \times 10^5$	1.2			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} biacetyl.	72A018

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.160	**1-Hydroxy-1-methyl-2-oxopropyl** — Continued							
	27.160.2 Hexaammineruthenium(III) ion							
	$CH_3\dot{C}OHCOCH_3 + Ru(NH_3)_6^{3+} \rightarrow$	$<3.8 \times 10^6$	1.2			p.r.	D.k. in Ar-satd. soln. contg. 0.001 mol L^{-1} biacetyl.	72A018
27.161	**1-Hydroxy-1-methyl-2-oxopropyl, conjugate base**							
	27.161.1 Hexaamminecobalt(III) ion							
	$[CH_3COCOCH_3]^{\bullet -} + Co(NH_3)_6^{3+} \rightarrow$	$\leq 1.8 \times 10^5$	5.5			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} biacetyl.	72A018
	27.161.2 Hexaammineruthenium(III) ion							
	$[CH_3COCOCH_3]^{\bullet -} + Ru(NH_3)_6^{3+} \rightarrow$	2.0×10^9	5.5			p.r.	D.k. in N_2O-satd. soln. contg. 0.01 mol L^{-1} biacetyl.	72A018
27.162	**1-Hydroxy-1-methyl-2-propenyl**							
	27.162.1 Safranine cation							
	$CH_3\dot{C}OHCH{=}CH_2 + ST^+ \rightarrow$ $H_2C{=}CHCOCH_3 + [ST]^{\bullet}$	1.6×10^9	6.8			p.r.	P.b.k. at 770 nm in N_2-satd. soln. contg. 6×10^{-3} mol L^{-1} methyl vinyl ketone, 5×10^{-5} mol L^{-1} safranine and 0.8 mol L^{-1} *tert*-BuOH.	90A306
	27.162.2 Thionine cation							
	$CH_3\dot{C}OHCH{=}CH_2 + Th^+ \rightarrow$ $H_2C{=}CHCOCH_3 + [ThH]^{\bullet +}$	3.2×10^9	6.8			p.r.	P.b.k. at 770 nm in N_2-satd. soln. contg. 6×10^{-3} mol L^{-1} methyl vinyl ketone, 5×10^{-5} mol L^{-1} thionine and 0.8 mol L^{-1} *tert*-BuOH.	90A306
27.163	**1-Hydroxy-1-methylpropyl**							
	27.163.1 Ferricyanide ion							
	$CH_3CH_2\dot{C}OHCH_3 + Fe(CN)_6^{3-} \rightarrow$ $Fe(CN)_6^{4-}$ + other prod.	4.8×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.1 mol L^{-1} 2-BuOH.	690522
	27.163.2 Oxygen							
	$CH_3CH_2\dot{C}OHCH_3 + O_2 \rightarrow$ $CH_3CH_2C(CH_3)(OH)OO^{\bullet}$	4.0×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.3 mol L^{-1} 2-BuOH and ferricyanide. rel. to $k(CH_3CH_2\dot{C}OHCH_3 + Fe(CN)_6^{3-}) = 4.8 \times 10^9$ $L\ mol^{-1}\ s^{-1}$.	690522
	27.163.3 Biacetyl							
	$CH_3CH_2\dot{C}OHCH_3 + CH_3COCOCH_3 \rightarrow$ $CH_3COCH_2CH_3 + H^+ +$ $[CH_3COCOCH_3]^{\bullet -}$	7.2×10^8				p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 2-BuOH.	680249
27.164	**1-Hydroxy-2-methylpropyl**							
	27.164.1 Ferricyanide ion							
	$(CH_3)_2CH\dot{C}HOH + Fe(CN)_6^{3-} \rightarrow$ $Fe(CN)_6^{4-}$ + other prod.	3.0×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.1 mol L^{-1} 2-methyl-1-propanol.	690522
	27.164.2 Oxygen							
	$(CH_3)_2CH\dot{C}HOH + O_2 \rightarrow$ $(CH_3)_2CHCH(OH)OO^{\bullet}$	3.4×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.3 mol L^{-1} 2-methyl-1-propanol and ferricyanide. rel. to $k((CH_3)_2CH\dot{C}HOH + Fe(CN)_6^{3-}) = 3.0 \times 10^9$ $L\ mol^{-1}\ s^{-1}$.	690522
	27.164.3 Hydrogen peroxide							
	$(CH_3)_2CH\dot{C}HOH + H_2O_2 \rightarrow$	2.2×10^5	6.8			γ-r.	Obs. $G(H_2O_2)$ in N_2O-satd. soln. contg. 2-methyl-1-propanol.	87G036
	27.164.4 Cysteamine, conjugate acid							
	$(CH_3)_2CH\dot{C}HOH + HSCH_2CH_2NH_3^+$ $\rightarrow$ *iso*-BuOH + $H_3N^+CH_2CH_2S^{\bullet}$	1.4×10^8				p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O- satd. soln. contg. 2-methyl-1-propanol.	680132

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.164	**1-Hydroxy-2-methylpropyl** — Continued							
27.164.5	**Nitrobenzene**							
	$(CH_3)_2CH\dot{C}HOH + C_6H_5NO_2 \rightarrow (CH_3)_2CHCHO + H^+ + [C_6H_5NO_2]^{\cdot-}$	3.9×10^8	7			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-methyl-1-propanol; 39% e-transfer.	660432
27.164.6	**Nitrosobenzene**							
	$(CH_3)_2CH\dot{C}HOH + C_6H_5NO \rightarrow (CH_3)_2CHCHO + C_6H_5\dot{N}OH$	4.0×10^9	7.0			p.r.	P.b.k. at 450 nm in N_2O-satd. soln. contg. 0.05 mol L^{-1} 2-methyl-1-propanol; includes β-alcohol radical reaction.	660433
27.165	**1-Hydroxy-2-methylpropyl, conjugate base**							
27.165.1	**Nitrobenzene**							
	$(CH_3)_2CH\dot{C}HO^- + C_6H_5NO_2 \rightarrow (CH_3)_2CHCHO + [C_6H_5NO_2]^{\cdot-}$	2.9×10^9	13			p.r.	P.b.k. at 285 nm in N_2O-satd. soln. contg. 2-methyl-1-propanol.	660432
27.166	**2-Hydroxy-1-methylpropyl**							
27.166.1	**3,10,17,24-Tetrasulfophthalocyaninecobaltate(II) ion**							
	$^{\cdot}CH(CH_3)CH(CH_3)OH + Co(tspc)^{4-} \rightarrow CH_3CHOHCH(CH_3)Co(tspc)^{4-}$	8×10^8	6.1			p.r.	P.b.k.	89A150
27.166.2	**Chromium(II) ion**							
	$^{\cdot}CH(CH_3)CH(CH_3)OH + Cr^{2+} \rightarrow CrCH(CH_3)CH(CH_3)OH^{2+}$	9.8×10^7	~3		293	p.r.	Abs. changes in N_2O-satd. soln. contg. 0.001 mol L^{-1} Cr^{2+} and 2-butene; $\Delta V‡ = 3.9$ cm^3 mol^{-1}, studied at 0.1-150 MPa.	92A361
		1.1×10^8	0-5			p.r.	P.b.k. in soln. satd. with 2-butene/N_2O, contg. (1-20) $\times 10^{-4}$ mol L^{-1} Cr^{2+}.	91A477
27.167	**4-Hydroxy-2-oxobutyl**							
27.167.1	**Hydroquinone monoanion**							
	$HOCH_2CH_2C\dot{O}CH_2 + 4\text{-}HOC_6H_4O^- \rightarrow$	6.2×10^8	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 2-hydroxytetrahydrofuran.	79A051
27.168	**3-Hydroxy-2-oxopropyl**							
27.168.1	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate ion)**							
	$HOCH_2C\dot{O}CH_2 + ABTS^{2-} \rightarrow$	2.1×10^7	4		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} glycerol 1-phosphate and (2-120) $\times 10^{-5}$ mol L^{-1} $ABTS^{2-}$.	88A159
27.169	**1-Hydroxypentyl**							
27.169.1	**Ferricyanide ion**							
	$CH_3(CH_2)_3\dot{C}HOH + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-}$ + other prod.	9×10^8				p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. 1-pentanol.	79N061
27.170	**2-Hydroxypropyl**							
27.170.1	**Copper(II) tetraglycine**							
	$^{\cdot}CH_2CHOHCH_3 + Cu(Gly_4)^{2-} \rightarrow (Gly_4)CuCH_2CHOHCH_3^{2-}$	2.7×10^9	8.2			p.r.	P.b.k. at 320 nm in soln. contg. 1 mol L^{-1} 2-PrOH. Also present is $(CH_3)_2\dot{C}OH$ which reduces $Cu(Gly_4)^{2-}$.	80A304
27.170.2	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$^{\cdot}CH_2CHOHCH_3 + MV^{\cdot+} \rightarrow$	$\sim 7 \times 10^8$	11.5			p.r.	D.k. (10%) at 600 nm, 0.5-1.5 ms after the pulse, in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} MV^{2+} and 0.1 mol L^{-1} 1-PrOH.	86A327
27.170.3	**2-Propanol**							
	$^{\cdot}CH_2CHOHCH_3 + 2\text{-PrOH} \rightarrow 2\text{-PrOH} + (CH_3)_2\dot{C}OH$	$>5 \times 10^1$				γ-r.	Estd. from rel. rates and $G(-H_2O_2)$ in soln. contg. H_2O_2 and 2-PrOH.	700104

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.171 2-Hydroxy-1-sulfonatoethyl, conjugate base							
27.171.1 2-Hydroxy-1-sulfonatoethyl, conjugate base							
$^-OCH_2\dot{C}HSO_3^- + {}^-OCH_2\dot{C}HSO_3^- \rightarrow$	9.6×10^8				p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. sodium vinyl sulfonate.	82A328
27.172 2-Hydroxy-1-sulfonatoethyl							
27.172.1 2-Hydroxy-1-sulfonatoethyl							
$HOCH_2\dot{C}HSO_3^- + HOCH_2\dot{C}HSO_3^- \rightarrow$	4.3×10^8				p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. sodium vinyl sulfonate.	82A328
27.172.2 Vinyl sulfonate ion							
$HOCH_2\dot{C}HSO_3^- + CH_2{=}CHSO_3^- \rightarrow HOCH_2CH(SO_3^-)CH_2\dot{C}HSO_3^-$	7×10^4	12.3	0.1-0.5		p.r.	D.k. (esr) in N_2O-satd. soln. contg. sodium vinyl sulfonate.	82A328
27.173 1-[Isobutyl (methylphosphato)methyl]-1-methylethyl							
27.173.1 Water							
$(Me)_2\dot{C}CH_2OPO(OCH_3)OCH_2CH(Me)_2 + H_2O \rightarrow H^+ + (CH_3)_2\dot{C}CH_2OH + HOPO(OCH_3)OCH_2CH(CH_3)_2$	$3 \times 10^4\ s^{-1}$	4.5-5		292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} methyl bis(2-methyl-1-propyl) phosphate	82A350
27.174 1-Isopropoxy-1-methylethyl							
27.174.1 Ferricyanide ion							
$(CH_3)_2\dot{C}OCH(CH_3)_2 + Fe(CN)_6^{3-} \rightarrow Fe(CN)_6^{4-}$ + other prod.	3.6×10^9	4-6		295	p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. diisopropyl ether.	82A041
27.174.2 Hexachloroiridate(IV) ion							
$(CH_3)_2\dot{C}OCH(CH_3)_2 + IrCl_6^{2-} \rightarrow IrCl_6^{3-}$ + other prod.	3.6×10^9	4-6		295	p.r.	D.k. at 490 nm in N_2O-satd. soln. contg. diisopropyl ether.	82A041
27.174.3 Hydrogen peroxomonosulfate ion							
$(CH_3)_2\dot{C}OCH(CH_3)_2 + HSO_5^- \rightarrow$	6.0×10^6				chem.	Esr study; soln. contg. Ti(III) sulfate, H_2O_2, HSO_5^- and diisopropyl ether.	90D226
27.174.4 Tetranitromethane							
$(CH_3)_2\dot{C}OCH(CH_3)_2 + C(NO_2)_4 \rightarrow HOC(CH_3)_2OCH(CH_3)_2 + C(NO_2)_3^- + {}^{\bullet}NO_2 + H^+$	4×10^9				p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 2×10^{-3} mol L^{-1} diisopropyl ether and tetranitromethane.	87G038
27.175 Methacrylamide, radical anion							
27.175.1 Water							
$[CH_2C(CH_3)CONH_2]^{\bullet-} + H_2O \rightarrow CH_3\dot{C}(CH_3)CONH_2 + OH^-$	$1.3 \times 10^6\ s^{-1}$	10-13			p.r.	D.k. in soln. contg. methacrylamide and borate buffer.	751052
27.176 Methacrylic acid, radical anion							
27.176.1 Water							
$[CH_2C(CH_3)CO_2H]^{\bullet-} + H_2O \rightarrow (CH_3)_2\dot{C}CO_2^- + H_2O$	$2.0 \times 10^5\ s^{-1}$	9.0			p.r.	D.k. in soln. contg. methacrylate; extrapolated to zero concn. of buffer.	761113
27.176.2 Hydroxide ion							
$[CH_2C(CH_3)CO_2H]^{\bullet-} + OH^- \rightarrow (CH_3)_2\dot{C}CO_2^- + OH^-$	8×10^8	>5.3	→0		p.r.	D.k. in soln. contg. methacrylate.	761113
27.177 1-(Methoxycarbonyl)-1-hydroxyethyl, conjugate base							
27.177.1 2-Methyl-1,4-naphthoquinone							
$CH_3\dot{C}(O^-)CO_2CH_3 + 2\text{-}CH_3NQ \rightarrow$	2.3×10^9	10.4			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. methyl lactate; 74% e-transfer (20% at pH 3.2).	731047

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.178	**Methoxycarbonylmethyl**							
27.178.1	**Oxygen**							
	$^{\bullet}CH_2CO_2CH_3 + O_2 \rightarrow$ $^{\bullet}OOCH_2CO_2CH_3$	1.8×10^9	4			p.r.	D.k. at 340 nm in soln. contg. 0.001 mol L^{-1} methyl chloroacetate, 0.05 mol L^{-1} formate ion and $(0.6\text{-}2) \times 10^{-4}$ mol L^{-1} oxygen.	78A402
27.179	**(1-Methoxyethoxy)methyl**							
27.179.1	**Tetranitromethane**							
	$CH_3CH(OCH_3)OCH_2 + C(NO_2)_4 \rightarrow$ $CH_3CH(OCH_3)OCH_2ON(\dot{O})C(NO_2)_3$	3×10^9	6.5			p.r.	P.b.k. at 300 and 350 nm in N_2O-satd. soln. contg. TNM and acetaldehyde dimethyl acetal.	90A004
27.180	**Methoxy(methoxycarbonyl)methyl**							
27.180.1	**Methoxy(methoxycarbonyl)methyl**							
	$CH_3O\dot{C}HCO_2CH_3 + CH_3O\dot{C}HCO_2CH_3 \rightarrow$	1.2×10^9				p.r.	D.k. at 260 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} methyl methoxyacetate; $\varepsilon = 1900$ L $mol^{-1}\ cm^{-1}$.	88A503
27.181	**(Methoxymethoxy)methyl**							
27.181.1	**Crotonic acid**							
	$CH_3OCH_2OCH_2 + CH_3CH{=}CHCO_2H \rightarrow$ addn.	6×10^5	~2			chem.	Esr study in soln. contg. 1.67×10^{-3} mol L^{-1} Ti(III), 1.67×10^{-3} mol L^{-1} H_2O_2 and dimethoxymethane; estimated from an assumed $2k$(R + R).	93D265
27.181.2	**Tetranitromethane**							
	$CH_3OCH_2OCH_2 + C(NO_2)_4 \rightarrow$ $CH_3OCH_2OCH_2ON(\dot{O})C(NO_2)_3$	5×10^9	4-13			p.r.	P.b.k. at 300 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} dimethoxymethane; adduct decomposes to nitroform anion (λ 350 nm), $k = 8.2 \times 10^2\ s^{-1}$.	80A071
27.182	**Methyl acetate, radical anion**							
27.182.1	**First-order reaction**							
	$CH_3\dot{C}(O^-)OCH_3 \rightarrow CH_3\dot{C}O + CH_3O^-$	$5.5 \times 10^5\ s^{-1}$	7.8			p.r.	D.k. at 260 nm; partial reaction to $CH_3CO_2^-$ + $^{\bullet}CH_3$.	78A402
27.182.2	**Hydrogen ion**							
	$CH_3\dot{C}(O^-)OCH_3 + H^+ \rightarrow$ $CH_3\dot{C}(OH)OCH_3$	1.4×10^{10}				p.r.	D.k. at 360 nm in soln. contg. methyl acetate and $(1\text{-}5) \times 10^{-5}$ mol L^{-1} $HClO_4$.	78A402
27.183	**4-Methyl-3,6-dioxo-1-piperazinylmethyl**							
27.183.1	**4-Methyl-3,6-dioxo-1-piperazinylmethyl**							
	$[N(CH_3)COCH_2N(\dot{C}H_2)COCH_2]^{\bullet} +$ $[N(CH_3)COCH_2N(\dot{C}H_2)COCH_2]^{\bullet} \rightarrow$	1.2×10^8	5.6			p.r.	D.k. at 350 nm in N_2O-satd. soln. contg. sarcosine anhydride; calcd. from $k_{overall} = 6.0 \times 10^8$ L $mol^{-1}\ s^{-1}$.	89A473
27.183.2	**Sarcosine anhydride**							
	$[N(CH_3)COCH_2N(\dot{C}H_2)COCH_2]^{\bullet} +$ $[N(CH_3)COCH_2N(CH_3)COCH_2]^{\bullet} \rightarrow$	6.0×10^2	5.6			p.r.	D.k. at 350 nm in N_2O-satd. soln. contg. sarcosine anhydride; calcd. from $k_{overall} = 6.0 \times 10^8$ L $mol^{-1}\ s^{-1}$.	89A473
27.184	**2-Methyl-1,3-dithiolan-2-yl**							
27.184.1	**2-Methyl-1,3-dithiolan-2-yl**							
	$[S\dot{C}(CH_3)S(CH_2)_2]^{\bullet} +$ $[S\dot{C}(CH_3)S(CH_2)_2]^{\bullet} \rightarrow$	2.0×10^9	~4			p.r.	D.k. at 310 nm in N_2O-satd. soln. contg. 2-methyl-1,3-dithiolane; $\varepsilon = 2350$ L mol^{-1} cm^{-1}.	86B043
27.185	**2-Methylene-1,3-dioxane radical cation**							
27.185.1	**Hydroxide ion**							
	$[(CH_2)_3OC(=CH_2)O]^{\bullet+} + OH^- \rightarrow$ $^{\bullet}CH_2CO_2(CH_2)_3OH$	9.0×10^8				p.r.	Condy. changes; radical from 2-(chloromethyl)-1,3-dioxane.	81D027

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.185	**2-Methylene-1,3-dioxane radical cation** — Continued							
27.185.2	**Hydrogen phosphate ion**							
	$[\overline{(CH_2)_3OC(=CH_2)O}]^{\cdot+} + HPO_4^{2-} \rightarrow [\overline{(CH_2)_3OC(OPO_3^{2-})(\dot{C}H_2)O}]$	8×10^6	3			phot.	Esr study; radical from 2-(chloromethyl)-1,3-dioxane; rel. to $k(R + OH^-) = 9.0 \times 10^8$ L $mol^{-1}\ s^{-1}$.	81D027
27.186	**2-Methylene-1,3-dioxolane radical cation**							
27.186.1	**Hydroxide ion**							
	$[\overline{(CH_2)_2OC(=CH_2)O}]^{\cdot+} + OH^- \rightarrow {}^{\cdot}CH_2CO_2CH_2CH_2OH$	6.4×10^9				p.r.	Condy. changes; radical from 2-(chloromethyl)-1,3-dioxolane.	81D027
27.186.2	**Hydrogen phosphate ion**							
	$[\overline{(CH_2)_2OC(=CH_2)O}]^{\cdot+} + HPO_4^{2-} \rightarrow [\overline{(CH_2)_2OC(OPO_3^{2-})(\dot{C}H_2)O}]$	$\sim 3 \times 10^8$	3			phot.	Esr study; radical from 2-(chloromethyl)-1,3-dioxolane; rel. to $k(R + OH^-) = 6.4 \times 10^9$ L $mol^{-1}\ s^{-1}$.	81D027
27.187	**Methyl methacrylate, radical anion**							
27.187.1	**Water**							
	$[CH_2C(CH_3)CO_2CH_3]^{\cdot-} + H_2O \rightarrow CH_3\dot{C}(CH_3)CO_2CH_3 + OH^-$	$4.5 \times 10^5\ s^{-1}$	9.8-12.8			p.r.	D.k. in soln. contg. methyl methacrylate and borate buffer.	751052
27.188	**1-Methyl-1-(methylthio)ethyl**							
27.188.1	**Tetranitromethane**							
	$(CH_3)_2\dot{C}SCH_3 + C(NO_2)_4 \rightarrow$ addn.	3.2×10^9	3.5		294	p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. methyl isopropyl sulfide.	84A087
27.189	**1-Methyl-2-oxopropyl**							
27.189.1	**Hydroquinone monoanion**							
	$CH_3CO\dot{C}HCH_3 + 4\text{-}HOC_6H_4O^- \rightarrow$	5.6×10^8	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 2,3-butanediol.	79A051
27.190	**1-(Methylsulfonatomethyl)ethyl**							
27.190.1	**Water**							
	$CH_3\dot{C}HCH_2OSO_2CH_3 + H_2O \rightarrow H^+ + CH_3\dot{C}HCH_2OH + CH_3SO_3H$	$2 \times 10^5\ s^{-1}$	4.5-5		292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} propyl methanesulfonate.	82A350
27.191	**1-(Methylsulfonatomethyl)-1-methylethyl**							
27.191.1	**Water**							
	$(CH_3)_2\dot{C}CH_2OSO_2CH_3 + H_2O \rightarrow H^+ + (CH_3)_2\dot{C}CH_2OH + CH_3SO_3H$	$\geq 10^6\ s^{-1}$	4.5-5		292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} 2-methylpropyl methanesulfonate.	82A350
27.192	**1-(Methylsulfonatomethyl)propyl**							
27.192.1	**Water**							
	$CH_3CH_2\dot{C}HCH_2OSO_2CH_3 + H_2O \rightarrow H^+ + CH_3CH_2\dot{C}HCH_2OH + CH_3SO_3H$	$\geq 10^6\ s^{-1}$	4.5-5		292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} butyl methanesulfonate.	82A350
27.193	**4-(Methylthio)butyl**							
27.193.1	**1,4-Benzoquinone**							
	$CH_3S(CH_2)_3\dot{C}H_2 + Q \rightarrow$ addn.	2.6×10^8	6			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} *tert*-BuOH and 0.1 mol L^{-1} 1-methylthiolanium.	*91A184*
27.194	**1-(Methylthio)butyl**							
27.194.1	**Tetranitromethane**							
	$CH_3S\dot{C}H(CH_2)_2CH_3 + C(NO_2)_4 \rightarrow$ addn.	2.2×10^9	3.5		294	p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. methyl butyl sulfide.	84A087

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.195	**1-(Methylthio)ethyl**							
27.195.1	**Tetranitromethane**							
	$CH_3\dot{C}HSCH_3 + C(NO_2)_4 \rightarrow$ addn.	4.2×10^9	3.5		294	p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. methyl ethyl sulfide.	84A087
27.196	**Methylthiomethyl**							
27.196.1	**Tetranitromethane**							
	$^{\bullet}CH_2SCH_3 + C(NO_2)_4 \rightarrow$ addn.	2.8×10^9	3.5		294	p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. dimethyl sulfide.	84A087
27.197	**5-(Methylthio)pentyl**							
27.197.1	**1,4-Benzoquinone**							
	$CH_3S(CH_2)_4\dot{C}H_2 + Q \rightarrow$ addn.	4.8×10^8	6			p.r.	P.b.k. in soln. contg. 1 mol L^{-1} *tert*-BuOH and 0.1 mol L^{-1} 1-methylthianium.	91A184
27.198	**1-(Methylthio)propyl**							
27.198.1	**Tetranitromethane**							
	$C_2H_5\dot{C}HSCH_3 + C(NO_2)_4 \rightarrow$ addn.	2.1×10^9	3.5		294	p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. methyl propyl sulfide.	84A087
27.199	**2-Oxocyclohexyl**							
27.199.1	**Hydroquinone monoanion**							
	$\overline{(CH_2)_4\dot{C}HCO} + 4\text{-}HOC_6H_4O^- \rightarrow$	5.5×10^8	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. 1,2-cyclohexanediol.	79A051
27.200	**1-Oxoethyl**							
27.200.1	**Chromium(II) ion**							
	$CH_3\dot{C}O + Cr^{2+} \rightarrow CrCOCH_3^{2+}$	3.1×10^8				f.p.	P.b.k. at 320 nm in soln. contg. $CH_3COCo([14]aneN_4)^{2+}$ and $(2.1\text{-}10.6) \times 10^{-3}$ *mol* L^{-1} *chromium(II) ion.*	92A424
27.200.2	**Tetranitromethane**							
	$CH_3\dot{C}O + C(NO_2)_4 \rightarrow C(NO_2)_3^- + {}^{\bullet}NO_2$ + other prod.	4.5×10^7				f.p.	P.b.k. at 350 nm in soln. contg. $CH_3COCo([14]aneN_4)^{2+}$ and (7-30) $\times 10^{-5}$ mol L^{-1} tetranitromethane.	92A424
27.201	**2-Oxoglutarate, radical anion**							
27.201.1	**2-Methyl-1,4-naphthoquinone**							
	$[^-O_2CCH_2CH_2COCO_2^-]^{\bullet -} + 2\text{-}CH_3NQ \rightarrow {}^-O_2CCH_2CH_2COCO_2^- + [2\text{-}CH_3NQ]^{\bullet -}$	3.8×10^9	10.2			p.r.	P.b.k. at 395 nm in soln. contg. α-ketoglutarate and 1 mol L^{-1} *tert*- BuOH; 94% *e*-transfer.	731047
27.202	**2-Oxopropyl**							
27.202.1	**2-Oxopropyl**							
	$CH_3CO\dot{C}H_2 + CH_3CO\dot{C}H_2 \rightarrow$	7×10^8	6.5			p.r.	D.k. at 300 nm in N_2O-satd. soln. contg. acetone.	86A285
27.202.2	**Oxygen**							
	$CH_3CO\dot{C}H_2 + O_2 \rightarrow CH_3COCH_2OO^{\bullet}$	3.1×10^9				p.r.	P.b.k. at 350 nm in N_2O/O_2 satd. soln. contg. 0.01 mol L^{-1} acetone.	86A285
27.202.3	**Cysteamine, conjugate acid**							
	$CH_3CO\dot{C}H_2 + HSCH_2CH_2NH_3^+ \rightarrow CH_3COCH_3 + H_3N^+CH_2CH_2S^{\bullet}$	~4×10^8				p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O- satd. soln. contg. acetone.	680132
27.202.4	**Hydroquinone monoanion**							
	$CH_3CO\dot{C}H_2 + 4\text{-}HOC_6H_4O^- \rightarrow Q^{\bullet -} + CH_3COCH_3$	1.2×10^9	~11.5			p.r.	P.b.k. at 430 nm (semiquinone) in N_2O-satd. soln. contg. 1,2-propanediol; radical mixture also contains $CH_3\dot{C}HCHO$.	79A051

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.202	**2-Oxopropyl** — Continued							
27.202.5	**2-Methyl-2-nitrosopropane**							
	$CH_3C\dot{O}CH_2 + (CH_3)_3CNO \rightarrow$ addn.	3.7×10^7	~7		~291	p.r.	P.b.k. (esr) in unbuffered N_2O-satd. soln. contg. 2 mol L^{-1} acetone and (0.25-15) × 10^{-3} mol L^{-1} MNP (assuming complete dimer dissociation).	91D097
27.202.6	***N,N,N′,N′*-Tetramethyl-*p*-phenylenediamine**							
	$CH_3C\dot{O}CH_2 + TMPD + H^+ \rightarrow CH_3COCH_3 + TMPD^{\cdot+}$	1.2×10^9	8.5			p.r.	P.b.k. at 565 nm in Ar-satd. soln. contg. 0.1 mol L^{-1} acetone and (0.2-1.8) × 10^{-4} mol L^{-1} TMPD.	86A285
27.203	**2-Propenyl, 1-hydroxy-1-(2-hydroxyethoxy)-, anion**							
27.203.1	**Dihydrogen phosphate ion**							
	$CH_2{=}C\dot{C}(O^-)OCH_2CH_2OH + H_2PO_4^- \rightarrow CH_3\dot{C}HCO_2CH_2CH_2OH + HPO_4^{2-}$	4×10^6				p.r.	D.k. in He-satd. soln. contg. 0.5 mol L^{-1} *tert*-BuOH and 2-hydroxyethyl acrylate.	93A106
27.204	**1-(Propylsulfatomethyl)ethyl**							
27.204.1	**Water**							
	$CH_3\dot{C}HCH_2OSO_3CH_2CH_2CH_3 + H_2O \rightarrow H^+ + CH_3\dot{C}HCH_2OH + HOSO_3CH_2CH_2CH_3$	$\geq 10^6\ s^{-1}$	4.5-5		292	p.r.	Condy. changes in N_2O-satd. soln. contg. 0.001-0.01 mol L^{-1} di-1-propyl sulfate.	82A350
27.205	**Radicals from acetylasparagine**							
27.205.1	**2-Methyl-1,4-naphthoquinone**							
	$R^{\cdot} + 2\text{-}CH_3NQ \rightarrow$	1.5×10^9	12.5			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. acetylasparagine; 39% *e*-transfer; ~12 % *e*-transfer at pH 3.2 and 6.0.	731047
27.206	**Radicals from acetyldiglycine**							
27.206.1	**Oxygen**							
	$AcGlyNH\dot{C}HCO_2^- + O_2 \rightarrow$ addn.	5.5×10^8	5.5			p.r.	D.k. at 330 nm in N_2O/O_2-satd. soln. contg. acetyldiglycine.	731052
27.206.2	**2-Methyl-1,4-naphthoquinone**							
	$AcGlyNH\dot{C}HCO_2 + 2\text{-}CH_3NQ \rightarrow$	3.8×10^9	12.3			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. acetyldiglycine; 55% *e*-transfer.	731047
27.207	**Radicals from acetylserineamide**							
27.207.1	**2-Methyl-1,4-naphthoquinone**							
	$R^{\cdot} + 2\text{-}CH_3NQ \rightarrow$	1.5×10^9 1.9×10^9	6, 9 11.0			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. acetylserineamide; 52%, 57%, and 68% *e*-transfer, resp., at pH 6, 9, and 11.	731047
27.208	**Radicals from acetyltrialanine**							
27.208.1	**2-Methyl-1,4-naphthoquinone**							
	$R^{\cdot} + 2\text{-}CH_3NQ \rightarrow$	2.6×10^9	12.3			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. acetyltrialanine; 47% *e*-transfer.	731047
		2.1×10^9	6.9			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. acetyltrialanine; 18% *e*-transfer.	731047
27.209	**Radicals from acetyltriglycine**							
27.209.1	**2-Methyl-1,4-naphthoquinone**							
	$R^{\cdot} + 2\text{-}CH_3NQ \rightarrow$	3.7×10^9	12.5			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. acetyltriglycine; 50% *e*-transfer.	731047

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.210	**Radicals from acetyltrisarcosine**							
27.210.1	**2-Methyl-1,4-naphthoquinone**							
	$R^{\bullet} + 2\text{-}CH_3NQ \rightarrow$	1.3×10^9	12.5			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. acetyltrisarcosine; 39% *e*-transfer at pH 12.5 and 7.0.	731047
27.211	**Radicals from arabinose**							
27.211.1	**Dithiothreitol**							
	$R^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow$	1.6×10^7	7.3			p.r.	P.b.k. at 390 nm ($RSSR^{-}$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and arabinose.	85A220
27.212	**Radicals from arachidonate**							
27.212.1	**Oxygen**							
	$L^{\bullet} + O_2 \rightarrow LOO^{\bullet}$	2×10^8	13			p.r.	D.k. at 280 nm in N_2O/O_2 satd. soln. contg. ~ $(4\text{-}8) \times 10^{-4}$ mol L^{-1} arachidonate.	78A365
27.213	**Radicals from 2-deoxygalactose**							
27.213.1	**Dithiothreitol**							
	$R^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow$	1.9×10^7	7.3			p.r.	P.b.k. at 390 nm ($RSSR^{-}$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and 2-deoxygalactose.	85A220
27.214	**Radicals from 2-deoxyglucose**							
27.214.1	**Dithiothreitol**							
	$R^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow$	9.2×10^7	7.3			p.r.	P.b.k. at 390 nm ($RSSR^{-}$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and 2-deoxyglucose.	85A220
27.215	**Radicals from deoxyribose**							
27.215.1	**Ferricyanide ion**							
	$dR^{\bullet} + Fe(CN)_6^{3-} \rightarrow$	1.4×10^9				p.r.	D.k. in soln. contg. 2-deoxy-D-ribose.	78A175
		2.8×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} deoxyribose.	710618
27.215.2	**Hydrogen ion**							
	$dR^{\bullet} + H^+ \rightarrow$ dehydration	1.5×10^7				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-deoxyribose at varied $[H^+]$; acid catalysis.	86A220
27.215.3	**Oxygen**							
	$dR^{\bullet} + O_2 \rightarrow dROO^{\bullet}$	2.0×10^9	5-6			p.r.	C.k. in N_2O-satd. soln. contg. deoxyribose; rel. to $k(dR^{\bullet} + Fe(CN)_6^{3-}) = 2.8 \times 10^9$ L $mol^{-1}\ s^{-1}$.	710618
27.215.4	**1,4-Benzoquinone**							
	$dR^{\bullet} + Q \rightarrow Q^{\bullet -}$ + deoxyribose	1.6×10^9	6-7			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-deoxyribose.	86A220
		2.7×10^9	5.6			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. deoxyribose.	730049
27.215.5	**Dithiothreitol**							
	$dR^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\bullet}$ + deoxyribose	1.8×10^8	7.4			p.r.	P.b.k. at 390 nm ($DTT^{\bullet -}$) in N_2O-satd. soln. contg. 2×10^{-4} mol L^{-1} dithiothreitol and 0.01 mol L^{-1} deoxyribose.	87A230
		2.4×10^7	7.3			p.r.	P.b.k. at 390 nm ($RSSR^{-}$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and 0.2 mol L^{-1} deoxyribose.	85A220
27.215.6	**Glutathione**							
	$dR^{\bullet} + GSH \rightarrow$ deoxyribose + $GS^{\bullet}$	3.5×10^7	8.4			p.r.	P.b.k. in N_2O-satd. soln. contg. deoxyribose.	84A012

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.215	**Radicals from deoxyribose** — Continued							
27.215.7	**2-Methyl-1,4-naphthoquinone**							
	$dR^{\bullet} + 2\text{-}CH_3NQ \rightarrow$	2.1×10^9	6.8			p.r.	P.b.k. in soln. contg. 0.05 mol L^{-1} deoxyribose; 81% *e*-transfer.	731047
		4×10^9	6.8			p.r.	P.b.k. at 400 nm in soln. contg. deoxyribose; 74% *e*-transfer.	723057
27.215.8	**Nifuroxime**							
	$dR^{\bullet} + NF \rightarrow$	1.4×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} deoxyribose; 70% *e*-transfer.	731099
27.215.9	**4-Nitroacetophenone**							
	$dR^{\bullet} + PNAP \rightarrow [PNAP]^{\bullet -} +$ other prod.	1.0×10^9				p.r.	P.b.k.; 47% *e*-transfer. Radicals from deoxyribose	751207
27.215.10	**2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl**							
	$dR^{\bullet} + TAN \rightarrow$	3.9×10^8	5-6			p.r.	C.k. in N_2O-satd. soln. contg. deoxyribose; rel. to $k(dR^{\bullet} + Fe(CN)_6^{3-}) = 2.8 \times 10^9$ L $mol^{-1}\ s^{-1}$.	710618
27.216	**Radicals from diglycine**							
27.216.1	**2-Methyl-1,4-naphthoquinone**							
	$NH_3^+CH_2CONH\dot{C}HCO_2^- + 2\text{-}CH_3NQ \rightarrow$	1.2×10^9	11.0			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. diglycine; 19% *e*-transfer at pH 6.6 and 47% at pH 11.	731047
27.217	**Radicals from 3,3-dimethyl-2-hydroxy-1,4-butyrolactone + OH**							
27.217.1	**Dithiothreitol**							
	$R^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\bullet} + RH$	6.0×10^7	7.4			p.r.	P.b.k. at 390 nm ($DTT^{\bullet -}$) in N_2O-satd. soln. contg. dithiothreitol and 3,3-dimethyl-2-hydroxy-1,4-butyrolactone.	87A250
27.218	**Radicals from erythritol, conjugate base**							
27.218.1	**First-order reaction**							
	$HOCH_2CHOH\dot{C}O^-CH_2OH \rightarrow OH^- + HOCH_2\dot{C}HCOCH_2OH$	$2.6 \times 10^6\ s^{-1}$	≥12			p.r.	C.k. in N_2O-satd. soln. contg. erythritol; rel. to k(R + *N*-methylisonicotinate ion) = 3.8×10^9 L $mol^{-1}\ s^{-1}$.	79A051
27.219	**Radicals from erythritol**							
27.219.1	**Hydrogen ion**							
	$HOCH_2\dot{C}(OH)CH(OH)CH_2OH + H^+ \rightarrow$ dehydration	2.9×10^6				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} erythritol at varied $[H^+]$; acid catalysis.	86A220
27.219.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$HOCH_2\dot{C}(OH)CH(OH)CH_2OH + MV^{2+} \rightarrow MV^{\bullet +} +$ other prod.	7.2×10^7	6			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} erythritol. Radical mixture also contains $HOCH_2CHOHCHOH\dot{C}HOH$.	86A220
27.220	**Radicals from fructose**							
27.220.1	**Dithiothreitol**							
	$R^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow$	1.2×10^7	7.3			p.r.	P.b.k. at 390 nm ($RSSR^{\bullet -}$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and fructose.	85A220
27.221	**Radicals from galactose**							
27.221.1	**Dithiothreitol**							
	$R^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow$	1.6×10^7	7.3			p.r.	P.b.k. at 390 nm ($RSSR^{\bullet -}$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and galactose.	85A220
27.222	**Radicals from glucose**							
27.222.1	**First-order reaction**							
	$R^{\bullet} \rightarrow$	$9 \times 10^4\ s^{-1}$				p.r.	C.k. with radical reaction with glutathione.	84A012

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.222	**Radicals from glucose** — Continued							
27.222.2	**Ferricyanide ion**							
	$R^{\bullet} + Fe(CN)_6^{3-} \rightarrow$	1.9×10^9	7			p.r.	D.k. at 410 nm in soln. contg. 0.3 mol L^{-1} glucose.	690522
27.222.3	**Hydrogen ion**							
	$R^{\bullet} + H^+ \rightarrow$ dehydration	1.1×10^6			293	p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} α-D-glucose and ~1×10^{-4} mol L^{-1} methyl viologen at varied pH.	88A159
27.222.4	**Oxygen**							
	$R^{\bullet} + O_2 \rightarrow ROO^{\bullet}$	1.6×10^9	7			p.r.	C.k. in N_2O/O_2 satd. soln. contg. 0.3 mol L^{-1} glucose and ferricyanide; rel. to k(R + ferricyanide) = 1.9×10^9 L $mol^{-1}\ s^{-1}$.	690522
27.222.5	**3-Carboxamido-2,2,5,5-tetramethylpyrrolidin-1-yloxy**							
	$R^{\bullet}$ + NX-s →	5.1×10^7	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} glucose; *e*-transfer.	761152
27.222.6	**3-Carboxamido-2,2,5,5-tetramethyl-3-pyrrolin-1-yloxy**							
	$R^{\bullet}$ + NX-u →	4.3×10^7	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} glucose; *e*-transfer.	761152
27.222.7	**1-Chloro-4-nitrobenzene**							
	$R^{\bullet} + 4\text{-}ClC_6H_4NO_2 \rightarrow$	4.0×10^8				p.r.	Abs. changes in soln. contg. glucose.	77R167
27.222.8	**Cysteamine, conjugate acid**							
	$R^{\bullet} + HSCH_2CH_2NH_3^+ \rightarrow$ $H_3N^+CH_2CH_2S^{\bullet}$ + other prod.	3.2×10^7				p.r.	P.b.k. at 410 nm ($RSSR^-$) in N_2O-satd. soln. contg. glucose.	680132
27.222.9	**1,1'-Dimethyl-4,4'-bipyridinium**							
	$R^{\bullet} + MV^{2+} \rightarrow MV^{\bullet+}$ + other prod.	1.2×10^8	5		293	p.r.	P.b.k. at 602 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} α-D-glucose and methyl viologen.	88A159
27.222.10	**3,5-Dinitrobenzonitrile**							
	$R^{\bullet} + 3,5\text{-}(O_2N)_2C_6H_3CN \rightarrow$ $[3,5\text{-}(O_2N)_2C_6H_3CN]^{\bullet-}$ + other prod.	1.0×10^9				p.r.	Abs. changes in soln. contg. glucose.	77R167
27.222.11	**1-(2,4-Dinitrophenyl)pyridinium**							
	$R^{\bullet} + 2,4\text{-}(NO_2)_2C_6H_3py^+ \rightarrow$ $[2,4\text{-}(NO_2)_2C_6H_3py]^{\bullet}$ + other prod.	1.0×10^9				p.r.	Abs. changes in soln. contg. glucose.	77R167
27.222.12	**Dithiothreitol**							
	$R^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow$	1.7×10^7	7.3			p.r.	P.b.k. at 390 nm ($RSSR^-$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and glucose.	85A220
27.222.13	**Glutathione**							
	$R^{\bullet} + GSH \rightarrow GS^{\bullet}$ + glucose	7×10^6	8.4			p.r.	P.b.k. in N_2O-satd. soln. contg. glucose.	84A012
27.222.14	**Hydroquinone monoanion**							
	$R^{\bullet} + 4\text{-}HOC_6H_4O^- \rightarrow$	7.1×10^8	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. glucose; 2-alkanonyl radicals by H-abstraction and dehydration.	79A051
27.222.15	**4-Nitroacetophenone**							
	$R^{\bullet} + PNAP \rightarrow [PNAP]^{\bullet-}$ + other prod.	9×10^8				p.r.	Abs. changes in soln. contg. glucose.	77R167
27.222.16	**4-Nitrobenzonitrile**							
	$R^{\bullet} + 4\text{-}O_2NC_6H_4CN \rightarrow$	1.0×10^9				p.r.	Abs. changes in soln. contg. glucose.	77R167
27.222.17	**2,2,6,6-Tetramethylpiperidine-*N*-oxyl**							
	$R^{\bullet}$ + TMPN →	4.9×10^7	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} glucose; addn. reaction.	761067
27.222.18	**2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl**							
	$R^{\bullet}$ + TAN →	5.9×10^7	acid			p.r.	Condy. changes in N_2O-satd. soln. contg. 0.1 mol L^{-1} glucose; addn. reaction.	761067

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No. Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.222 Radicals from glucose — Continued							
27.222.18 2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl — Continued							
	$<1 \times 10^8$	5-6			p.r.	C.k. with ferricyanide in N_2O-satd. soln. contg. glucose.	710618
27.222.19 Tetranitromethane							
$R^{\bullet} + C(NO_2)_4 \rightarrow$	2.6×10^9				p.r.	P.b.k. at 366 nm in N_2O-satd. soln. 0.25 mol L^{-1} glucose.	650183
27.222.20 Thionine cation							
$R^{\bullet} + Th^+ \rightarrow [ThH]^{\bullet+}$ + other prod.	1.6×10^9	6.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} glucose and 10^{-4} mol L^{-1} thionine.	87A451
27.222.21 Toluidine Blue cation							
$R^{\bullet} + TB^+ \rightarrow [TBH]^{\bullet+}$ + other prod.	2.2×10^9	6.8			p.r.	P.b.k. at 830 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} glucose.	89A262
27.222.22 2,4,6-Trinitrobenzenesulfonate ion							
$R^{\bullet} + 2,4,6\text{-}(NO_2)_3C_6H_2SO_3^- \rightarrow$	1.1×10^9				p.r.	Abs. changes in soln. contg. glucose.	77R167
27.223 Radicals from glycylglycinamide							
27.223.1 2-Methyl-1,4-naphthoquinone							
$H_2N\dot{C}HCONHCH_2CONH_2$ + 2-CH_3NQ $\rightarrow$	8.5×10^8 8.5×10^8	6.8 11.0			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycylglycinamide; 25% *e*-transfer at pH 6.8 (16% *e*-transfer at pH 5.5 and 45% at pH 11.0).	731047
27.224 Radicals from glycylsarcosine							
27.224.1 2-Methyl-1,4-naphthoquinone							
$H_3N^+CH_2CON(CH_3)\dot{C}HCO_2^-$ + 2-CH_3NQ $\rightarrow$	1.0×10^9	10.9			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. glycylsarcosine; 46% *e*-transfer (20% at pH 6.8).	731047
27.225 Radicals from linolenate							
27.225.1 Oxygen							
$L^{\bullet} + O_2 \rightarrow LOO^{\bullet}$	3.2×10^8	10.9			p.r.	D.k. at 280 nm in N_2O/O_2 satd. soln. contg. linolenate.	87A277
	3×10^8	10.5-13			p.r.	D.k. at 280 nm in N_2O/O_2 satd. soln. contg. ~ $(4\text{-}8) \times 10^{-4}$ mol L^{-1} linolenate.	78A365
27.226 Radicals from linoleate							
27.226.1 Oxygen							
$L^{\bullet} + O_2 \rightarrow LOO^{\bullet}$	3×10^8	10.5-13			p.r.	D.k. at 280 nm in N_2O/O_2 satd. soln. contg. 0.01 mol L^{-1} linoleate and 0.02 mol L^{-1} phosphate.	78A365
27.227 Radicals from myoinositol							
27.227.1 Hydrogen ion							
$C_6H_{11}O_6 + H^+ \rightarrow$ dehydration	5.7×10^5				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} myoinositol (isomer with β-OH axial) at varied $[H^+]$; acid catalysis; $k = 1.0 \times 10^5$ L $mol^{-1}\ s^{-1}$ for β-OH equatorial isomer.	86A220
27.227.2 1,1′-Dimethyl-4,4′-bipyridinium							
$C_6H_{11}O_6 + MV^{2+} \rightarrow MV^{\bullet+}$ + other prod.	1×10^8	6			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} myoinositol. (isomer with β-OH axial); $k = 2 \times 10^7$ L $mol^{-1}\ s^{-1}$ for β-OH equatorial.	86A220

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.228	**Radicals from oleate**							
27.228.1	**Oxygen**							
	$L^{\bullet} + O_2 \rightarrow LOO^{\bullet}$	1.0×10^9	13			p.r.	D.k. at 280 nm in N_2O/O_2 satd. soln. contg. ~ (4-8) $\times 10^{-4}$ mol L^{-1} oleate.	78A365
27.229	**Radicals from ribose**							
27.229.1	**Dithiothreitol**							
	$R^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\bullet} + RH$	9.0×10^7	7.4			p.r.	P.b.k. at 390 nm ($DTT^{\bullet-}$) in N_2O-satd. soln. contg. dithiothreitol and ribose.	87A250
		1.2×10^7	7.3			p.r.	P.b.k. at 390 nm ($RSSR^{\bullet-}$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and 0.2 mol L^{-1} ribose.	85A220
27.229.2	***N*-Ethylmaleimide**							
	$R^{\bullet} + NEM \rightarrow$	2.1×10^9	6-7			p.r.	Abs. changes in soln. contg. ribose; 30% *e*-transfer, 20% addn. based on abs. spectra.	720144
27.229.3	**Hydroquinone monoanion**							
	$R^{\bullet} + 4\text{-}HOC_6H_4O^- \rightarrow$	9.6×10^8	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. ribose; 2-alkanonyl radicals by H-abstraction and dehydration.	79A051
27.229.4	**2-Methyl-1,4-naphthoquinone**							
	$R^{\bullet} + 2\text{-}CH_3NQ \rightarrow$	1.4×10^9	6.9			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.5 mol L^{-1} ribose; 60% *e*-transfer.	731047
		2.6×10^9	6.9			p.r.	P.b.k. in N_2O-satd. soln. contg. ribose; 44% *e*-transfer.	723057
27.229.5	**Nifuroxime**							
	$R^{\bullet} + NF \rightarrow$	1.5×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.01 mol L^{-1} ribose; 50% *e*-transfer.	731099
27.230	**Radicals from ribose 5-phosphate**							
27.230.1	**Dithiothreitol**							
	$R^{\bullet} + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\bullet} + RH$	$\sim 5 \times 10^7$	7.4			p.r.	P.b.k. at 390 nm ($DTT^{\bullet-}$) in N_2O-satd. soln. contg. dithiothreitol and D-ribose-5-phosphate.	87A250
		5×10^6	7.3			p.r.	P.b.k. at 390 nm ($RSSR^{\bullet-}$) in N_2O-satd. soln. contg. 5×10^{-4} mol L^{-1} DTT and ribose 5-phosphate.	85A220
27.230.2	**2-Methyl-1,4-naphthoquinone**							
	$R^{\bullet} + 2\text{-}CH_3NQ \rightarrow$	4.0×10^9	6.8			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. ribose-5-phosphate; 25% *e*-transfer.	723057
27.230.3	**Nifuroxime**							
	$R^{\bullet} + NF \rightarrow$	1.7×10^9	7			p.r.	P.b.k. at 390 nm in N_2O-satd. soln. contg. 0.001 mol L^{-1} ribose phosphate; 10% *e*-transfer.	731099
27.231	**Radicals from sodium dodecylsulfate**							
27.231.1	**1,4-Benzoquinone**							
	$R^{\bullet} + Q \rightarrow Q^{\bullet-}$ + other prod.	1.2×10^9				p.r.	P.b.k. at 430 nm in soln. contg. 0.1 mol L^{-1} sodium dodecylsulfate; k(R + micelle) = 9.9×10^8 L $mol^{-1}\ s^{-1}$.	78A261
27.232	**Radicals from sorbitol**							
27.232.1	**Hydroquinone monoanion**							
	$R^{\bullet} + 4\text{-}HOC_6H_4O^- \rightarrow$	9.8×10^8	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. sorbitol; 2-alkanonyl radicals by H-abstraction and dehydration.	79A051

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.233	**Radicals from sucrose**							
27.233.1	**Tetranitromethane**							
	$C_{12}H_{21}O_{12} + C(NO_2)_4 \rightarrow$	8.3×10^8				p.r.	P.b.k. in soln. contg. 0.1 or 0.01 mol L^{-1} sucrose.	650183
		7.0×10^8				p.r.	P.b.k. at 350 nm in N_2O-satd. soln. contg. 0.1 *mol* L^{-1} *sucrose.*	640133
27.234	**Radicals from triglycine**							
27.234.1	**9,10-Anthraquinone-2,6-disulfonate ion**							
	$R^{\bullet} + 2,6\text{-}diSO_3AQ^{2-} \rightarrow [2,6\text{-}diSO_3AQ]^{\bullet 3-}$ + other prod.	1.8×10^9	10			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. triglycine.	731104
27.234.2	**9,10-Anthraquinone-2-sulfonate ion**							
	$R^{\bullet} + 2\text{-}SO_3AQ^- \rightarrow [2\text{-}SO_3AQ]^{\bullet 2-}$ + other prod.	1.4×10^9	10			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. triglycine.	731104
27.234.3	**1,4-Benzoquinone**							
	$R^{\bullet} + Q \rightarrow GlyGlyGly + Q^{\bullet -}$	2.5×10^9	10			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. triglycine	731104
27.234.4	**2-Hydroxy-1,4-naphthoquinone**							
	$R^{\bullet} + 2\text{-}(OH)NQ \rightarrow 2\text{-}(OH)NQ^{\bullet -}$ + other prod.	1.9×10^9	10			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. triglycine.	731104
27.234.5	**2-Methyl-1,4-naphthoquinone**							
	$R^{\bullet} + 2\text{-}CH_3NQ \rightarrow$	1.8×10^9	12.0			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. triglycine; 77% *e*-transfer.	731047
		1.8×10^9	7.0			p.r.	P.b.k. at 395 nm in N_2O-satd. soln. contg. triglycine; 11% *e*-transfer.	731047
		1.9×10^9	10			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. triglycine.	731104
27.234.6	**1,4-Naphthoquinone-2-sulfonate ion**							
	$R^{\bullet} + 2\text{-}SO_3NQ^- \rightarrow [2\text{-}SO_3NQ]^{\bullet 2-}$ + other prod.	2.0×10^9	10			p.r.	P.b.k. at 400 nm in N_2O-satd. soln. contg. triglycine.	731104
27.235	**Radicals from xylitol**							
27.235.1	**Hydroquinone monoanion**							
	$R^{\bullet} + 4\text{-}HOC_6H_4O^- \rightarrow$	1.2×10^9	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. xylitol; 2-alkanonyl radicals by H-abstraction and dehydration.	79A051
27.236	**Sarcosine anhydride, radical anion**							
27.236.1	**Acetophenone**							
	$[\overline{N(CH_3)COCH_2N(CH_3)COCH_2}]^{\bullet -} + C_6H_5COCH_3 \rightarrow \overline{N(CH_3)COCH_2N(CH_3)COCH_2} + C_6H_5\dot{C}O^-CH_3$	2.0×10^9 2.1×10^9	5.2 12.4			p.r.	P.b.k. at 280 nm (320 at pH 12.4) in soln. contg. sarcosine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.236.2	**Benzophenone**							
	$[\overline{N(CH_3)COCH_2N(CH_3)COCH_2}]^{\bullet -} + (C_6H_5)_2CO \rightarrow \overline{N(CH_3)COCH_2N(CH_3)COCH_2} + (C_6H_5)_2\dot{C}O^-$	2.3×10^9 2.4×10^9	5.2 12.2			p.r.	P.b.k. at 330 nm (320 at pH 12.2) in soln. contg. sarcosine anhydride and 1 mol L^{-1} *tert*-BuOH.	710554
27.236.3	**Cysteine**							
	$[\overline{N(CH_3)COCH_2N(CH_3)COCH_2}]^{\bullet -}$ + CysSH → electron transfer	1.5×10^8	7.0			p.r.	D.k. at 265 nm in soln. contg. 1 mol L^{-1} *tert*-BuOH and sarcosine anhydride.	710554
27.236.4	**2-Methyl-1,4-naphthoquinone**							
	$[\overline{N(CH_3)COCH_2N(CH_3)COCH_2}]^{\bullet -}$ + $2\text{-}CH_3NQ \rightarrow [2\text{-}CH_3NQ]^{\bullet -}$ + other prod.	4.6×10^9	6.0			p.r.	P.b.k. at 395 nm in soln. contg. sarcosine anhydride; 91% *e*-transfer.	731047

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
27.237	**Sorbic acid, radical anion**							
27.237.1	**Water**							
	$[CH_3CHCHCHCHCO_2H]^{\cdot-} + H_2O \rightarrow$	5.0×10^4 s^{-1}	11.1			p.r.	D.k. in sorbate soln.; extrapolated to zero concn. of buffer.	761113
27.237.2	**Hydroxide ion**							
	$[CH_3CHCHCHCHCO_2H]^{\cdot-} + OH^- \rightarrow$	$\sim 2 \times 10^7$	>6.4	→0		p.r.	D.k. in soln. contg. sorbate.	761113
27.238	**1-Sulfatoethyl**							
27.238.1	**Ferricyanide ion**							
	$CH_3\dot{C}HOSO_3^- + Fe(CN)_6^{3-} \rightarrow$	$\sim 2 \times 10^8$				p.r.	D.k. at 420 nm in N_2O-satd. soln. contg. ethylsulfate ion; similar values are given also for radicals produced from reaction of $^{\cdot}OH$ with octyl and decyl sulfates.	79N061
27.239	**1,1,2,2-Tetrachloro-2-hydroxyethyl**							
27.239.1	**First-order reaction**							
	$^{\cdot}CCl_2CCl_2OH \rightarrow {}^{\cdot}CCl_2C(O)Cl + H^+ + Cl^-$	$>7 \times 10^5$ s^{-1}			298	p.r.	Condy. changes in in N_2O-satd. soln. contg. tetrachloroethylene.	94A397
		$>7 \times 10^5$ s^{-1}				p.r.	Abs. changes in N_2O-satd. soln. contg. 10^{-4} mol L^{-1} tetrachloroethylene.	710709
27.240	**Tetrahydro-2,5-dimethyl-2-furanyl**							
27.240.1	**Dithiothreitol**							
	$\overline{\dot{O}C(CH_3)CH_2CH_2CH(CH_3)} + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\cdot} + \overline{OCH(CH_3)CH_2CH_2CH(CH_3)}$	6.1×10^8	8.1		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N_2O-satd. soln. contg. DTT and 2,5-dimethyltetrahydrofuran.	87G007
27.241	**Tetrahydro-2-furanyl**							
27.241.1	**Hydrogen peroxide**							
	$\overline{\dot{O}CH(CH_2)_3} + H_2O_2 \rightarrow$	3×10^4				chem.	Esr study in Ti(III)-H_2O_2 soln. contg. tetrahydrofuran; used $2k$(R + R) = 3×10^9 L mol^{-1} s^{-1}.	745144
27.241.2	**Hydrogen peroxomonosulfate ion**							
	$\overline{\dot{O}CH(CH_2)_3} + HSO_5^- \rightarrow$	$\sim 1.8 \times 10^6$				chem.	Esr study; soln. contg. Ti(III) sulfate, H_2O_2, HSO_5^- and tetrahydrofuran.	90D226
27.241.3	**Carbon tetrachloride**							
	$\overline{\dot{O}CH(CH_2)_3} + CCl_4 \rightarrow Cl^-$ + other prod.	2.0×10^7				p.r.	Condy. changes; buildup of HCl in N_2O-satd. soln. contg. tetrahydrofuran and CCl_4.	710778
27.241.4	**1,4-Dicyanobenzene**							
	$\overline{\dot{O}CH(CH_2)_3} + DCNB \rightarrow$	5×10^7	~7			p.r.	P.b.k. at 345 nm in N_2O-satd. soln. contg. tetrahydrofuran.	91A229
27.241.5	**Dithiothreitol**							
	$\overline{\dot{O}CH(CH_2)_3} + HSCH_2(CHOH)_2CH_2SH \rightarrow HSCH_2(CHOH)_2CH_2S^{\cdot} + THF$	1.2×10^8	7.2		293	p.r.	P.b.k. at 400 nm (cyclized radical anion) in N_2O-satd. soln. contg. DTT and tetrahydrofuran.	87G007
27.241.6	**4-Nitroacetophenone**							
	$\overline{\dot{O}CH(CH_2)_3} + PNAP \rightarrow \overline{O(CH_2)_3CHON(\dot{O})C_6H_4\text{-}4\text{-}COCH_3}$	1.0×10^9	5-7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} tetrahydrofuran $\Delta H\ddagger$ = 11.1 kJ mol^{-1}, $\Delta S\ddagger$ = −34 J K^{-1} mol^{-1}; studied at 273-333 K.	88A099
27.241.7	**4-Nitrobenzonitrile**							
	$\overline{\dot{O}CH(CH_2)_3} + 4\text{-}O_2NC_6H_4CN \rightarrow \overline{O(CH_2)_3CHON(\dot{O})C_6H_4\text{-}4\text{-}CN}$	1.3×10^9	5-7		293	p.r.	P.b.k. in N_2O-satd. soln. contg. 1 mol L^{-1} tetrahydrofuran; $\Delta H\ddagger$ = 9.1 kJ mol^{-1}, $\Delta S\ddagger$ = −39 J K^{-1} mol^{-1}; studied at 273-333 K.	88A099

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
27.241	**Tetrahydro-2-furanyl** — Continued							
27.241.8	**Thionine cation**							
	$\overline{\dot{O}CH(CH_2)_3}$ + Th^+ → $[ThH]^{\cdot+}$ + other prod.	4.6×10^9	6.8			p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} THF and 10^{-4} mol L^{-1} thionine.	87A451
27.241.9	**Toluidine Blue cation**							
	$\overline{\dot{O}CH(CH_2)_3}$ + TB^+ → $[TBH]^{\cdot+}$ + other prod.	3.7×10^9	6.8			p.r.	P.b.k. at 830 nm in N_2O-satd. soln. contg. 0.1 mol L^{-1} THF.	89A262
27.242	**Tetrahydrofuranyl(hydroxy)methyl**							
27.242.1	**Hydrogen ion**							
	$\overline{OCH_2CH_2CH_2\dot{C}HCHOH}$ + H^+ → $HOCH_2CH_2CH_2\dot{C}HCHO + H_2O + H^+$	2.8×10^6				p.r.	P.b.k. in N_2O-satd. soln. contg. 0.1 mol L^{-1} 2-hydroxymethylfuran at varied $[H^+]$; acid catalysis.	86A220
27.243	**Tetrahydro-2-pyranyl**							
27.243.1	**Tetrahydro-2-pyranyl**							
	$\overline{\dot{O}CH(CH_2)_4}$ + $\overline{\dot{O}CH(CH_2)_4}$ →	~9×10^8			300	p.r.	D.k. at 250 nm in N_2O-satd. soln. contg. tetrahydropyran; calcd. assuming parallel first and second order reactions.	86A377
27.244	**1,1,2-Trichloro-2-oxoethyl**							
27.244.1	**1,1,2-Trichloro-2-oxoethyl**							
	$^{\cdot}CCl_2C(O)Cl$ + $^{\cdot}CCl_2C(O)Cl$ → $ClC(O)CCl_2CCl_2C(O)Cl$	3.5×10^8			298	p.r.	D.k. at 265 nm in N_2O-satd. soln. contg. tetrachloroethylene; $\varepsilon = 4100$ L mol^{-1} cm^{-1}.	94A397
		1.6×10^8				p.r.	D.k. at 265 nm in N_2O-satd. soln. contg. 10^{-4} mol L^{-1} tetrachloroethylene; $\varepsilon = 2500$ L mol^{-1} s^{-1} (from graph).	710709
27.244.2	**Oxygen**							
	$^{\cdot}CCl_2C(O)Cl + O_2 \rightarrow ClC(O)CCl_2OO^{\cdot}$	1.2×10^9				p.r.	P.b.k. at 260 nm in N_2O/O_2 satd. soln. contg. 0.001 mol L^{-1} tetrachloroethylene.	94A221
27.245	**1-[Tri(ethoxy)methoxy]ethyl**							
27.245.1	**Hexachloroiridate(IV) ion**							
	$(C_2H_5O)_3COCHCH_3 + IrCl_6^{2-} \rightarrow (CH_3O)_3COCH_2^+ + IrCl_6^{3-}$	2.2×10^9	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L^{-1} triethyl orthocarbonate and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $IrCl_6^{2-}$; $k = 3.4 \times 10^9$ L mol^{-1} s^{-1} from condy. meas.	86A155
27.245.2	**Ferricyanide ion**							
	$(C_2H_5O)_3COCHCH_3 + Fe(CN)_6^{3-} \rightarrow (CH_3O)_3COCH_2^+ + Fe(CN)_6^{4-}$	1.8×10^9	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L^{-1} triethyl orthocarbonate and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $Fe(CN)_6^{3-}$.	86A155
27.246	**Triethoxymethyl**							
27.246.1	**Ferricyanide ion**							
	$(C_2H_5O)_3\dot{C} + Fe(CN)_6^{3-} \rightarrow (C_2H_5O)_3C^+ + Fe(CN)_6^{4-}$	1.6×10^9	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L^{-1} triethyl orthoformate and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $Fe(CN)_6^{3-}$.	86A155
27.246.2	**Hexachloroiridate(IV) ion**							
	$(C_2H_5O)_3\dot{C} + IrCl_6^{2-} \rightarrow (C_2H_5O)_3C^+ + IrCl_6^{3-}$	2.9×10^9	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L^{-1} triethyl orthoformate and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $IrCl_6^{2-}$.	86A155

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
27.247	**2,2,2-Trifluoro-1-(difluoromethoxy)ethyl**							
27.247.1	**Oxygen**							
	$CHF_2O\dot{C}HCF_3 + O_2 \rightarrow CHF_2OCH(OO^{\bullet})CF_3$	1.4×10^9				p.r.	Eval. from leveling off of rate of reaction of peroxyl radical with ABTS, chlorpromazine, promethazine, ascorbate and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L^{-1} *tert*-BuOH and isoflurane.	88A364
27.248	**1,2,2-Trifluoro-2-(difluoromethoxy)ethyl**							
27.248.1	**Oxygen**							
	$CHF_2OCF_2\dot{C}HF + O_2 \rightarrow CHF_2OCF_2CHFOO^{\bullet}$	1.2×10^9				p.r.	Eval. from leveling off of rate of reaction of peroxyl radical with ABTS, chlorpromazine, promethazine and propyl gallate at high concn. of substrates in air-satd. soln. contg. 0.5-1 mol L^{-1} *tert*-BuOH and enflurane.	88A364
27.249	**2,2,2-Trifluoro-1-hydroxyethyl**							
27.249.1	***N-rac*-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion**							
	$^{\bullet}CHOHCF_3$ + *N-rac*-Co(4,11-dieneN$_4$)$^{2+}$ → $CF_3CHOHCo(4,11\text{-dieneN}_4)^{2+}$	1×10^7	6			p.r.	P.b.k.	78A200
27.250	**3,4,5-Trihydroxy-2-oxocyclohexyl**							
27.250.1	**Hydroquinone monoanion**							
	$\dot{C}(CHOH)_3CH_2CHCO$ + 4-$HOC_6H_4O^-$ →	6.4×10^8	~11.5			p.r.	P.b.k. at 430 nm in N_2O-satd. soln. contg. *meso*-inositol.	79A051
27.251	**1,2,3-Trihydroxypropyl, conjugate base**							
27.251.1	**First-order reaction**							
	$HOCH_2CHOH\dot{C}HO^- \rightarrow OH^- + HOCH_2\dot{C}HCHO$	2.8×10^6 s^{-1}	≥12			p.r.	C.k. in N_2O-satd. soln. contg. glycerol; rel. to k(R + *N*-methylisonicotinate ion) = 3.8×10^9 L mol^{-1} s^{-1}.	79A051
27.252	**Tri(methoxy)methoxymethyl**							
27.252.1	**Ferricyanide ion**							
	$(CH_3O)_3CO\dot{C}H_2 + Fe(CN)_6^{3-} \rightarrow (CH_3O)_3COCH_2^+ + Fe(CN)_6^{4-}$	3.8×10^8	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L^{-1} trimethyl orthocarbonate and (5-50) × 10^{-5} mol L^{-1} $Fe(CN)_6^{3-}$.	86A155
27.252.2	**Hexachloroiridate(IV) ion**							
	$(CH_3O)_3CO\dot{C}H_2 + IrCl_6^{2-} \rightarrow (CH_3O)_3COCH_2^+ + IrCl_6^{3-}$	3.0×10^9	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L^{-1} trimethyl orthocarbonate and (5-50) × 10^{-5} mol L^{-1} $IrCl_6^{2-}$; $k = 4.0 \times 10^9$ L mol^{-1} s^{-1} from condy. meas.	86A155
27.253	**Trimethoxymethyl**							
27.253.1	**Ferricyanide ion**							
	$(CH_3O)_3\dot{C} + Fe(CN)_6^{3-} \rightarrow (CH_3O)_3C^+ + Fe(CN)_6^{4-}$	1.7×10^9	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L^{-1} trimethyl orthoformate and (5-50) × 10^{-5} mol L^{-1} $Fe(CN)_6^{3-}$.	86A155
27.253.2	**Hexachloroiridate(IV) ion**							
	$(CH_3O)_3\dot{C} + IrCl_6^{2-} \rightarrow (CH_3O)_3C^+ + IrCl_6^{3-}$	3.8×10^9	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L^{-1} trimethyl orthoformate and (5-50) × 10^{-5} mol L^{-1} $IrCl_6^{2-}$.	86A155
27.253.3	**Tetranitromethane**							
	$(CH_3O)_3\dot{C} + C(NO_2)_4 \rightarrow (CH_3O)_3C^+ + {}^{\bullet}NO_2 + C(NO_2)_3^-$	~2×10^9	7.9		293	p.r.	P.b.k. at 350 nm in soln. contg. 0.01 mol L^{-1} trimethyl orthoformate and (5-50) × 10^{-5} mol L^{-1} tetranitromethane.	86A155

TABLE 27. Miscellaneous Substituted Alkyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
27.254	**Trimethylammoniomethyl**							
27.254.1	**2,2′-Azinobis(3-ethylbenzothiazoline-6-sulfonate ion)**							
	$^{\bullet}CH_2N^{+}(CH_3)_3 + ABTS^{2-} \rightarrow ABTS^{\bullet-} +$ other prod.	4×10^8				p.r.	P.b.k.; radical from tetramethylammonium ion.	86A113
27.255	**Tri(1-methylethoxy)methyl**							
27.255.1	**Ferricyanide ion**							
	$((CH_3)_2CHO)_3\dot{C} + Fe(CN)_6^{3-} \rightarrow ((CH_3)_2CHO)_3C^{+} + Fe(CN)_6^{4-}$	2.7×10^9	7-8		293	p.r.	D.k. at 420 nm in soln. contg. 0.01 mol L^{-1} triisopropoxymethane and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $Fe(CN)_6^{3-}$.	86A155
27.255.2	**Hexachloroiridate(IV) ion**							
	$((CH_3)_2CHO)_3\dot{C} + IrCl_6^{2-} \rightarrow ((CH_3)_2CHO)_3C^{+} + IrCl_6^{3-}$	2.8×10^9	7-8		293	p.r.	D.k. at 490 nm in soln. contg. 0.01 mol L^{-1} triisopropoxymethane and $(5\text{-}50) \times 10^{-5}$ mol L^{-1} $IrCl_6^{2-}$.	86A155

TABLE 28. Benzyl

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
28.1	**Benzyl**							
	$C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2 \rightarrow C_6H_5CH_2CH_2C_6H_5$	1.5×10^9				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) × 10^{-3} mol L^{-1} pentaammine(phenylacetato)cobalt(III) ion; log A = 12.57, E_a = 17.58 kJ mol^{-1}, studied at 275.5-338 K.	93A123 93A346
		3.2×10^9	~7			p.r.	D.k. in soln. contg. benzylammonium ion.	86A410
		2.9×10^9	11			p.r.	D.k. at 258 and 316 nm in N_2-satd. soln. contg. benzyl trimethylammonium and 0.5 mol L^{-1} MeOH; ε = 14400 and 1750 L mol^{-1} cm^{-1}, resp.; radical mixt. contains $^{\bullet}CH_2OH$.	81A034
		1.2×10^9	>13			p.r.	D.k. in N_2O-satd. soln. contg. toluene; ε = 14400 and 5500 L mol^{-1} cm^{-1}, at 258 and 317 nm, resp.	730089
28.2	**Cobal(II)amin**							
	$C_6H_5\dot{C}H_2$ + B12r → $(C_6H_5CH_2)$B12	3.5×10^8	1		297	therm.	Eval. from K and k_r and $k(C_6H_5CH_2 + Cr^{2+})$ in soln. contg. benzylcobalamin and Cr^{2+}.	85A500
28.3	**Chromium(II) ion**							
	$C_6H_5\dot{C}H_2 + Cr^{2+} \rightarrow CrCH_2C_6H_5^{2+}$	8.5×10^7	acid	0.1	296	f.p.	P.b.k. at 364 nm in soln. contg. 5×10^{-4} mol L^{-1} dibenzyl ketone, (0.8-4.0) × 10^{-4} mol L^{-1} Cr^{2+}, 2 mol L^{-1} acetonitrile and 0.05 mol L^{-1} $HClO_4$. Alternatively, the radical was obtained from photolysis of benzylchromium.	84A300
28.4	**1,4,8,12-Tetraazacyclopentadecanechromium(II) ion**							
	$C_6H_5\dot{C}H_2 + Cr([15]aneN_4)^{2+} \rightarrow C_6H_5CH_2Cr([15]aneN_4)^{2+}$	1.9×10^8			298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ as indicator and $C_6H_5CH_2Co(dmgH)_2$.	91A427
28.5	**Copper(II) ion**							
	$C_6H_5\dot{C}H_2 + Cu^{2+} \rightarrow CuCH_2C_6H_5^{2+}$	2.8×10^6			293	f.p.	D.k. in soln. contg. $Co(NH_3)_5(C_6H_5CH_2CO_2)^{2+}$ and $Cu(ClO_4)_2$.	93A346
		2.4×10^7			293	f.p.	D.k. in soln. contg. dibenzyl ketone, $Cu(ClLO_4)_2$ and 10% acetonitrile; log A = 7.94, E_a = 3.1 kJ mol^{-1}, studied at 274-333 K.	92A148
		2.1×10^7	2.8		300	f.p.	P.b.k. at 375 nm, (as well as d.k. at 317 nm) in soln. contg. $[Co(NH_3)_5OCOCH_2C_6H_5]^{2+}$ and (1-4) × 10^{-3} mol L^{-1} $CuSO_4$; $k = 5.3 \times 10^7$ in micellar soln. contg. 0.2 mol L^{-1} SDS.	84A367
28.6	**Benzylcopper(III) ion**							
	$C_6H_5\dot{C}H_2 + CuCH_2C_6H_5^{2+} \rightarrow C_6H_5CH_2CH_2C_6H_5 + Cu^{2+}$	2.6×10^9				f.p.	D.k. in soln. contg. $Co(NH_3)_5(C_6H_5CH_2CO_2)^{2-}$ and $Cu(ClO_4)_2$.	93A346
		3.2×10^9			295	f.p.	D.k. in soln. contg. dibenzyl ketone, $Cu(ClO_4)_2$ and 10% acetonitrile.	92A148
28.7	**1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion**							
	$C_6H_5\dot{C}H_2 + Ni(Me_4[14]aneN_4)^+ \rightarrow$ addn.	$\sim 10^8$				phot.	Estd. from product yields.	86M180
28.8	**α-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$C_6H_5\dot{C}H_2 + \alpha\text{-Ni(cyclam)}^{2+} + H_2O \rightarrow \alpha\text{-}C_6H_5CH_2Ni(cyclam)(H_2O)^{2+}$	4.7×10^7	0	6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and benzylcobalt(III) complex.	91A515
28.9	**β-1,4,8,11-Tetraazacyclotetradecanenickel(II) ion**							
	$C_6H_5\dot{C}H_2 + \beta\text{-Ni(cyclam)}^{2+} \rightarrow$ addn.	$< 2 \times 10^5$	0	1.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and benzylcobalt(III) complex.	91A515

TABLE 28. Benzyl — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
28.10	**Oxygen**							
	$C_6H_5\dot{C}H_2 + O_2 \rightarrow C_6H_5CH_2OO^{\bullet}$	2.8×10^9	1		298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ as indicator and 0.1 mol L^{-1} $HClO_4$; benzyl radical from $RCo(dmgH)_2$ or $RCo(cyclam)^{2+}$.	91A176
		2.0×10^9	7			p.r.	D.k. at 316 nm in N_2/O_2 satd. soln. contg. 2% *tert*-BuOH and ~10^{-3} mol L^{-1} benzyl chloride.	89A165
28.11	**Vanadium(II) ion**							
	$C_6H_5\dot{C}H_2 + V^{2+} + H^+ \rightarrow C_6H_5CH_3 + V^{3+}$	1.2×10^5	2		296	f.p.	D.k. at 600 nm in soln. 0.01-0.03 mol L^{-1} H^+, (1-5) × 10^{-4} mol L^{-1} $C_6H_5CH_2Co(dmgH)(H_2O)$ or $C_6H_5CH_2Co(cyclam)^{2+}$, (5-38) × 10^{-6} mol L^{-1} $MV^{\bullet+}$ as indicator and 0.01-0.06 mol L^{-1} V^{2+}.	91A428
28.12	**2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonate) radical anion**							
	$C_6H_5\dot{C}H_2 + ABTS^{\bullet-} \rightarrow$ addn.	1.2×10^9 1.1×10^9	0	1.0 6.0	298	f.p.	D.k. at 650 nm in soln. contg. $ABTS^{\bullet-}$ (from ABTS + Br_2) and alkylcobalt(III) complex.	91A515
28.13	**Cysteamine, conjugate acid**							
	$C_6H_5\dot{C}H_2 + HSCH_2CH_2NH_3^+ \rightarrow C_6H_5CH_3 + H_3N^+CH_2CH_2S^{\bullet}$	2.0×10^4	7			γ-r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$; obs. bibenzyl and toluene formn.	82G282
28.14	**Cysteine**							
	$C_6H_5\dot{C}H_2 + CysSH \rightarrow C_6H_5CH_3 + CysS^{\bullet}$	2.1×10^4	7			γ-r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$ L mol^{-1} s^{-1}; obs. bibenzyl and toluene formn.	82G282
28.15	**1,1'-Dimethyl-4,4'-bipyridinium radical cation**							
	$C_6H_5\dot{C}H_2 + MV^{\bullet+} \rightarrow$	1.2×10^9			298	f.p.	D.k. at 600 nm in soln. contg. $MV^{\bullet+}$ and $C_6H_5CH_2Co(dmgH)$.	91A427
		1.5×10^9	2		296	f.p.	D.k. in soln. contg. 0.01-0.03 mol L^{-1} H^+, (1-5) × 10^{-4} mol L^{-1} $C_6H_5CH_2Co(dmgH)(H_2O)$ or $C_6H_5CH_2Co(cyclam)^{2+}$, (5-38) × 10^{-6} mol L^{-1} $MV^{\bullet+}$.	91A428
28.16	**1,2-Ethanedithiol**							
	$C_6H_5\dot{C}H_2 + HSCH_2CH_2SH \rightarrow C_6H_5CH_3 + HSCH_2CH_2S^{\bullet}$	5.9×10^4	7			γ-r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$ L mol^{-1} s^{-1}; obs. bibenzyl and toluene formn.	82G282
28.17	**Methanol**							
	$C_6H_5\dot{C}H_2 + MeOH \rightarrow C_6H_5CH_3 + {}^{\bullet}CH_2OH$	2.5×10^{-1}	7			γ-r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$ L mol^{-1} s^{-1}; obs. bibenzyl and toluene formn.	82G282
28.18	**2,2,6,6-Tetramethylpiperidine-*N*-oxyl**							
	$C_6H_5\dot{C}H_2 + TMPN \rightarrow$ addn.	5.4×10^7	5.5		296.4	therm.	C.k. in 0.1 mol L^{-1} acetate buffer; benzyl radical from $C_6H_5CH_2Cr^{2+}$; rel. to $k({}^{\bullet}CH_2C_6H_5 + B12r) = 3.5 \times 10^8$ L mol^{-1} s^{-1}.	85A500
28.19	**Thiophenol**							
	$C_6H_5\dot{C}H_2 + C_6H_5SH \rightarrow C_6H_5CH_3 + C_6H_5S^{\bullet}$	4.0×10^4	7			γ-r.	C.k. assuming $2k(C_6H_5\dot{C}H_2 + C_6H_5\dot{C}H_2) = 2 \times 10^9$ L mol^{-1} s^{-1}; obs. bibenzyl and toluene formn.	82G282

TABLE 29. Substituted Benzyl Radicals

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
29.1	**2-Carboxy-2-hydroxy-1-(4-hydroxyphenyl)ethyl, anion**							
29.1.1	**Hydrogen ion**							
	$4\text{-}HOC_6H_4\dot{C}HCHOHCO_2^- + H^+ \rightarrow$ $4\text{-}HOC_6H_4\dot{C}HCHOHCO_2H$	3.8×10^{10}				p.r.	D.k. as a function of $[H^+]$ in N_2O-satd. soln.; $k_r = 2.9 \times 10^5\ s^{-1}$.	84A206
29.2	**4-Chlorobenzyl**							
29.2.1	**4-Chlorobenzyl**							
	$4\text{-}ClC_6H_4\dot{C}H_2 + 4\text{-}ClC_6H_4\dot{C}H_2 \rightarrow$ $4\text{-}ClC_6H_4CH_2CH_2C_6H_4\text{-}4\text{-}Cl$	2.1×10^9				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) × 10^{-3} mol L^{-1} pentaammine(4-chlorophenylacetato)cobalt(III) ion; log A = 12.97, E_a = 19.11 kJ mol^{-1}, studied at 275.5-338 K.	93A123 93A346
29.2.2	**Copper(II) ion**							
	$4\text{-}ClC_6H_4\dot{C}H_2 + Cu^{2+} \rightarrow$ $CuCH_2C_6H_4\text{-}4\text{-}Cl^{2+}$	1.6×10^6			293	f.p.	D.k. in soln. contg. $Co(NH_3)_5(4\text{-}ClC_6H_4CH_2CO_2)^{2+}$ and $Cu(ClO_4)_2$.	93A346
29.3	**4-Cyanobenzyl**							
29.3.1	**4-Cyanobenzyl**							
	$4\text{-}CNC_6H_4\dot{C}H_2 + 4\text{-}CNC_6H_4\dot{C}H_2 \rightarrow$	1×10^9	13.7			p.r.	D.k. in N_2O-satd. soln. contg. 4-cyanotoluene; ε_{275} = 30,000 ± 1000 and ε_{315} = 3,500 ± 200 L $mol^{-1}\ cm^{-1}$.	79A350
29.4	**Diphenylmethyl**							
29.4.1	**Diphenylmethyl**							
	$(C_6H_5)_2\dot{C}H + (C_6H_5)_2\dot{C}H \rightarrow$	3.5×10^9	~7			p.r.	D.k. at 328 nm in soln. contg. diphenylmethylammonium ion.	86A410
29.4.2	**Oxygen**							
	$(C_6H_5)_2\dot{C}H + O_2 \rightarrow (C_6H_5)_2CHOO^{\cdot}$	7.5×10^8	6.5			p.r.	D.k. at 328 nm in N_2/O_2 satd. soln. contg. 5×10^{-3} mol L^{-1} diphenylmethylammonium ion.	89A165
29.5	**Flavone-8-methyl**							
29.5.1	**Oxygen**							
	$F\text{-}8\text{-}CH_3 + O_2 \rightarrow F\text{-}8\text{-}CH_3OO^{\cdot}$	1.0×10^9	6.8			p.r.	D.k. at 410 nm in N_2/O_2 (2.5-12 vol %) satd. soln. contg. 0.02 mol L^{-1} $K_2S_2O_8$, 0.02 mol L^{-1} *tert*-BuOH and 0.001 mol L^{-1} flavone-8-acetate ion	93A549
29.6	**4-Methoxybenzyl**							
29.6.1	**4-Methoxybenzyl**							
	$4\text{-}CH_3OC_6H_4\dot{C}H_2 + 4\text{-}CH_3OC_6H_4\dot{C}H_2 \rightarrow$ $4\text{-}CH_3OC_6H_4CH_2CH_2C_6H_4\text{-}4\text{-}OCH_3$	3.0×10^9				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) × 10^{-3} mol L^{-1} pentaammine(4-methoxyphenylacetato)cobalt(III) ion; log A = 12.35, E_a = 14.68 kJ mol^{-1}, studied at 275.5-338 K.	93A123 93A346
29.6.2	**Copper(II) ion**							
	$4\text{-}CH_3OC_6H_4\dot{C}H_2 + Cu^{2+} \rightarrow$ $CuCH_2C_6H_4\text{-}4\text{-}OCH_3^{2+}$	8.0×10^6			293	f.p.	D.k. in soln. contg. $Cu(ClO_4)_2$ and $Co(NH_3)_5(4\text{-}CH_3OC_6H_4CH_2CO_2)^{2+}$.	93A346
29.6.3	**(4-Methoxyphenyl)methylcopper(III) ion**							
	$4\text{-}CH_3OC_6H_4\dot{C}H_2 +$ $CuCH_2C_6H_4\text{-}4\text{-}OCH_3^{2+} \rightarrow$ $4\text{-}CH_3OC_6H_4CH_2CH_2C_6H_4\text{-}4\text{-}OCH_3 +$ Cu^{2+}	5.8×10^8				f.p.	D.k. in soln. contg. $Cu(ClO_4)_2$ and $Co(NH_3)_5(4\text{-}CH_3OC_6H_4CH_2CO_2)^{2-}$.	93A346

TABLE 29. Substituted Benzyl Radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
29.7	**4-Methylbenzyl**							
29.7.1	**4-Methylbenzyl**							
	$4\text{-}CH_3C_6H_4\dot{C}H_2 + 4\text{-}CH_3C_6H_4\dot{C}H_2 \rightarrow 4\text{-}CH_3C_6H_4CH_2CH_2C_6H_4\text{-}4\text{-}CH_3$	2.3×10^9				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) × 10^{-3} mol L^{-1} pentaammine(4-methylphenylacetato)cobalt(III) ion; log A = 12.75, E_a = 17.65 kJ mol^{-1}, studied at 275.5-338 K.	93A123 93A346
29.7.2	**Copper(II) ion**							
	$4\text{-}CH_3C_6H_4\dot{C}H_2 + Cu^{2+} \rightarrow CuCH_2C_6H_4\text{-}4\text{-}CH_3^{2+}$	5.7×10^6			293	f.p.	D.k. in soln. contg. $Co(NH_3)_5(4\text{-}CH_3C_6H_4CH_2CO_2)^{2+}$ and $Cu(ClO_4)_2$.	93A346
29.7.3	**(4-Methylphenyl)methylcopper(III) ion**							
	$4\text{-}CH_3C_6H_4\dot{C}H_2 + CuCH_2C_6H_4\text{-}4\text{-}CH_3^{2+} \rightarrow 4\text{-}CH_3C_6H_4CH_2CH_2C_6H_4\text{-}4\text{-}CH_3 + Cu^{2+}$	5.1×10^8				f.p.	D.k. in soln. contg. $Co(NH_3)_5(4\text{-}CH_3C_6H_4CH_2CO_2)^{2-}$ and $Cu(ClO_4)_2$.	93A346
29.8	**4-Nitrobenzyl**							
29.8.1	**4-Nitrobenzyl**							
	$4\text{-}NO_2C_6H_4\dot{C}H_2 + 4\text{-}NO_2C_6H_4\dot{C}H_2 \rightarrow 4\text{-}NO_2C_6H_4CH_2CH_2C_6H_4\text{-}4\text{-}NO_2$	2.1×10^9				f.p.	D.k. at 315 nm in soln. contg. (0.4-1.2) × 10^{-3} mol L^{-1} pentaammine(4-nitrophenylacetato)cobalt(III) ion; log A = 12.18, E_a = 14.62 kJ mol^{-1}, studied at 275.5-338 K.	93A123
29.8.2	**Oxygen**							
	$4\text{-}NO_2C_6H_4\dot{C}H_2 + O_2 \rightarrow 4\text{-}NO_2C_6H_4CH_2OO^{\bullet}$	9×10^8	7			p.r.	D.k. at 360 nm in N_2/O_2 satd. soln. contg. 3×10^{-4} mol L^{-1} 4-nitrobenzyl bromide.	89A165
29.9	**1-Phenylethyl**							
29.9.1	**1-Phenylethyl**							
	$C_6H_5\dot{C}HCH_3 + C_6H_5\dot{C}HCH_3 \rightarrow$	2.8×10^9	~7			p.r.	D.k. in soln. contg. α-methylbenzylammonium ion.	86A410

TABLE 30. α-Hydroxybenzyl radicals

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
30.1	**Acetophenone radical anion**							
30.1.1	**Acetophenone radical anion**							
	$C_6H_5\dot{C}O^-CH_3 + C_6H_5\dot{C}O^-CH_3 \rightarrow$	3.2×10^8	12.5		298	p.r.	D.k. at 440 nm; $\varepsilon = 6 \times 10^3$ L mol^{-1} cm^{-1}; $A = 9.7 \times 10^{10}$ L moL^{-1} s^{-1}, $E_a = 14.2$ kJ mol^{-1}, studied at 293-343 K.	81A168
30.1.2	**Oxygen**							
	$C_6H_5\dot{C}O^-CH_3 + O_2 \rightarrow$	1.8×10^6	12.5			p.r.	D.k. at 440 nm in soln. contg. acetophenone and O_2; $A = 1.3 \times 10^{10}$ L moL^{-1} s^{-1}, $E_a = 22$ kJ mol^{-1}, studied at 293-343 K; peroxyl radical formation, not electron transfer.	81A168
30.1.3	**Benzophenone**							
	$C_6H_5\dot{C}O^-CH_3 + (C_6H_5)_2CO \rightarrow C_6H_5COCH_3 + (C_6H_5)_2\dot{C}O^-$	1.3×10^9	13			p.r.	Abs. changes in N_2O-satd. soln. contg. acetophenone and 0.5 mol L^{-1} MeOH, $k = 2.0 \times 10^9$ L mol^{-1} s^{-1} in 2% CMC matrix.	80A116
		7.8×10^8	12			p.r.	D.k., as well as p.b.k. in N_2-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, acetophenone and benzophenone; ε at 600 nm ($(C_6H_5)_2\dot{C}O^-$) = 4800 L mol^{-1} cm^{-1}. pK_a = 9.2; ε at 445 nm ($C_6H_5\dot{C}O^-CH_3$) = 2600 L mol^{-1} cm^{-1}, pK_a = 9.6.	730122
30.1.4	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$C_6H_5\dot{C}OHCH_3 + MV^{2+} \rightarrow C_6H_5COCH_3 + MV^{\cdot+} + H^+$	4.3×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} *4-methoxyphenol, acetophenone and* methyl viologen.	84B033
30.1.5	**4-Nitroacetophenone**							
	$C_6H_5\dot{C}O^-CH_3 + PNAP \rightarrow C_6H_5COCH_3 + [PNAP]^{\cdot-}$	5.2×10^9	11			p.r.	D.k., as well as p.b.k. at 550 nm in N_2-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.002 mol L^{-1} acetophenone and (2-6) $\times 10^{-4}$ mol L^{-1} 4′-nitroacetophenone; ε at 445 nm ($C_6H_5\dot{C}O^-CH_3$) = 2600 L mol^{-1} cm^{-1}, pK_a = 9.6; ε at 545 nm $[PNAP]^{\cdot-}$ = 2900 L mol^{-1} cm^{-1}, pK_a = 2.5-2.7.	730122
30.1.6	**Cytochrome C**							
	$C_6H_5\dot{C}OHCH_3 + Cyt\ C\ (Fe^{3+}) \rightarrow C_6H_5COCH_3 + Cyt\ C\ (Fe^{2+}) + H^+$	8.0×10^8	7.0		295	p.r.	P.b.k. at 550 nm in soln. contg. acetophenone.	78A288
30.2	**Benzamide radical anion**							
30.2.1	**3,4-Dihydroxyphenethylamine**							
	$C_6H_5\dot{C}O^-NH_2 + 3,4\text{-}(HO)_2C_6H_3CH_2CH_2NH_2 \rightarrow$	5.9×10^8			298	p.r.	D.k. at 430 nm in N_2-satd. soln. contg. 4×10^{-3} mol L^{-1} benzamide and 0.5 mol L^{-1} *tert*-BuOH; $k_r = 2.2 \times 10^7$ L mol^{-1} s^{-1}.	94A395
30.3	**Benzoate radical dianion**							
30.3.1	**D-Amino acid oxidase**							
	$C_6H_5\dot{C}O_2^{2-} + DAAO \rightarrow$	1.2×10^9	8.3			p.r.	D.k. at 409 nm in soln. contg. 5×10^{-3} mol L^{-1} phosphate buffer, 0.1 mol L^{-1} *tert*-BuOH, 5×10^{-6} mol L^{-1} DDAO and 2.5×10^{-2} mol L^{-1} benzoate.	83A082
30.3.2	**Cytochrome C**							
	$C_6H_5\dot{C}O_2^{2-} + Cyt\ C\ (Fe^{3+}) \rightarrow C_6H_5CO_2^- + Cyt\ C\ (Fe^{2+})$	1.8×10^9	7		295	p.r.	P.b.k. at 550 nm in soln. contg. benzoate.	78A288
30.3.3	**Cytochrome C, carboxymethylated**							
	$C_6H_5\dot{C}O_2^{2-} + Cxm\text{-}cyt\ C \rightarrow$	1.4×10^9	7		295	p.r.	P.b.k. at 550 nm in soln. contg. benzoate.	78A288

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
30.3	**Benzoate radical dianion** — Continued							
30.3.4	**Hemin c**							
	$C_6H_5\dot{C}O_2^{2-} + Hem\text{-}Fe^{III} \rightarrow$	2.1×10^9	7		295	p.r.	P.b.k. at 550 nm in soln. contg. benzoate.	78A288
30.3.5	**Metmyoglobin**							
	$C_6H_5\dot{C}O_2^{2-} + Fe^{3+}Mb \rightarrow$	1.8×10^9	7		295	p.r.	P.b.k. at 550 nm in soln. contg. benzoate.	78A288
30.4	**Benzophenone radical anion**							
30.4.1	**Benzophenone radical anion**							
	$(C_6H_5)_2\dot{C}O^- + (C_6H_5)_2\dot{C}O^- \rightarrow (C_6H_5)_2CHOHCHOH(C_6H_5)_2$	3×10^5	12		273	f.p./rq	D.k. in soln. contg. benzophenone and 0.5% 1-PrOH.	82A414
		$\leq 3.7 \times 10^4$	13	0.25		f.p./rq	Chronoamperometric study in soln. contg. benzophenone and 50% EtOH, studied at pH 5.5-13.	767776
		$\sim 2 \times 10^6$	12			p.r.	D.k. at 610 nm in N_2O-satd. soln. contg. benzophenone and 50% MeOH, using ε = 6800 $L\ mol^{-1}\ cm^{-1}$.	751125
		$\leq 9 \times 10^4$				f.p./rq	D.k. at 543 nm in soln. contg. benzophenone and 50% 2-PrOH, studied at pH 10-13; using ε = 5100 $L\ mol^{-1}\ cm^{-1}$; $pK_a = 9.2$.	63F024
	$(C_6H_5)_2\dot{C}O^- + (C_6H_5)_2\dot{C}OH \rightarrow (C_6H_5)_2CHOHCHOH(C_6H_5)_2$	1.7×10^9	alk.			f.p./rq	D.k. at 630 nm in soln. contg. 40% 2-PrOH, 0.005 mol L^{-1} ketone and 0.05 mol L^{-1} NaOH; using ε = 5100 $L\ mol^{-1}\ cm^{-1}$.	90A060
		5.5×10^9		0.25		f.p./rq	Chronoamperometric study in soln. contg. benzophenone and 50% EtOH, studied at pH 5.5-13.	767776
		1.1×10^9				f.p./rq	D.k. at 543 nm in soln. contg. benzophenone and 50% 2-PrOH, studied at pH 10-13; using ε = 5100 $L\ mol^{-1}\ cm^{-1}$; $pK_a = 9.2$.	63F024
	$(C_6H_5)_2\dot{C}OH + (C_6H_5)_2\dot{C}OH \rightarrow (C_6H_5)_2CHOHCHOH(C_6H_5)_2$	1.2×10^9	5			p.r.	D.k. at 330 nm in soln. contg. 0.001 mol L^{-1} benzophenone, 0.04 mol L^{-1} phosphate buffer and 1.0 mol L^{-1} *tert*-BuOH.	94A467
		7.5×10^8				f.p./rq	D.k. in soln. contg. ~0.001 mol L^{-1} benzophenone and 5% EthOH or 2-PrOH; ε = 3000 $L\ mol^{-1}\ cm^{-1}$.	89A499
		1.0×10^9			295	f.p.	D.k. at 540 nm in soln. contg. 10^{-4} mol L^{-1} benzophenone.	88A294
		8.0×10^8	2.0		273	f.p./rq	D.k. in soln. contg. benzophenone	82A414
		4.3×10^8	~7			f.p./rq	D.k. at 550 nm in Ar-satd. soln. contg. 0.001 mol L^{-1} benzophenone and 50% 2-PrOH.	79N121
		1.2×10^8	5.5	0.25		f.p./rq	Chronoamperometric study in soln. contg. benzophenone and 50% EtOH, studied at pH 5.5-13.	767776
30.4.2	**First-order reaction**							
	$(C_6H_5)_2\dot{C}OH \rightarrow H^+ + (C_6H_5)_2\dot{C}O^-$	$8.3 \times 10^6\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and benzophenone.	86A248
30.4.3	**9,10-Anthraquinone-2-sulfonate ion**							
	$(C_6H_5)_2\dot{C}O^- + 2\text{-}SO_3AQ^- \rightarrow (C_6H_5)_2CO + [2\text{-}SO_3AQ]^{\bullet 2-}$	4.0×10^5	alk.			f.p./rq	D.k. at 630 nm in soln. contg. 50% 2-PrOH, 0.005 mol L^{-1} benzophenone, 0.08 mol L^{-1} NaOH and anthraquinone-2-sulfonate.	88A209

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
30.4	**Benzophenone radical anion** — Continued							
30.4.4	**Brilliant Green cation**							
	$(C_6H_5)_2\dot{C}OH + BG^+ \rightarrow (C_6H_5)_2CO + [BGH]^{\bullet+}$	8.0×10^8	5			p.r.	P.b.k. at 340 nm in soln. contg. 0.001 mol L^{-1} benzophenone, 0.04 mol L^{-1} phosphate buffer, 1.0 mol L^{-1} *tert*-BuOH and (4-10) × 10^{-5} mol L^{-1} dye.	94A467
30.4.5	**Crystal Violet cation**							
	$(C_6H_5)_2\dot{C}OH + CV^+ \rightarrow (C_6H_5)_2CO + [CVH]^{\bullet+}$	4.0×10^8	5			p.r.	P.b.k. at 340 nm in soln. contg. 0.001 mol L^{-1} benzophenone, 0.04 mol L^{-1} phosphate buffer, 1.0 mol L^{-1} *tert*-BuOH and (4-10) × 10^{-5} mol L^{-1} dye.	94A467
30.4.6	**1,4-Diazabicyclo[2.2.2]octane radical cation**							
	$(C_6H_5)_2\dot{C}O^- + DABCO^{\bullet+} \rightarrow (C_6H_5)_2CO +$ DABCO	8.7×10^9				f.p./rq	D.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.05 mol L^{-1} DABCO and benzophenone; used ε(radical anion) = 6000 L mol^{-1} cm^{-1}.	86A248
30.4.7	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$(C_6H_5)_2\dot{C}O^- + MV^{2+} \rightarrow (C_6H_5)_2CO + MV^{\bullet+}$	3.2×10^4	alk.			f.p./rq	D.k., as well as p.b.k. at 605 nm in soln. contg. 50% 2-PrOH, 0.005 mol L^{-1} benzophenone, 0.08 mol L^{-1} NaOH and methyl viologen.	88A209
	$(C_6H_5)_2\dot{C}OH + MV^{2+} \rightarrow (C_6H_5)_2CO + MV^{\bullet+} + H^+$	1.4×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, benzophenone and methyl viologen.	84B033
30.4.8	**1,3-Dinitrobenzene**							
	$(C_6H_5)_2\dot{C}OH + 1,3\text{-}C_6H_4(NO_2)_2 \rightarrow (C_6H_5)_2CO + H^+ + [1,3\text{-}C_6H_4(NO_2)_2]^{\bullet-}$	4.2×10^6			293	f.p./oq	D.k. at 542 nm in soln. contg. UO_2^{2+}, benzilic acid and 25% acetone.	80A320
30.4.9	**1,4-Dinitrobenzene**							
	$(C_6H_5)_2\dot{C}OH + 1,4\text{-}C_6H_4(NO_2)_2 \rightarrow (C_6H_5)_2CO + H^+ + [1,4\text{-}C_6H_4(NO_2)_2]^{\bullet-}$	3.8×10^7			293	f.p./oq	D.k. at 542 nm in soln. contg. UO_2^{2+}, benzilic acid and 25% acetone.	80A320
30.4.10	**3,4-Dinitrobenzoate ion**							
	$(C_6H_5)_2\dot{C}OH + 3,4\text{-}(NO_2)_2C_6H_3CO_2^- \rightarrow (C_6H_5)_2CO + H^+ + [3,4\text{-}(NO_2)_2C_6H_3CO_2]^{\bullet 2-}$	3.7×10^7			293	f.p./oq	D.k. at 542 nm in soln. contg. UO_2^{2+}, benzilic acid and 25% acetone.	80A320
30.4.11	**Malachite Green cation**							
	$(C_6H_5)_2\dot{C}OH + MG^+ \rightarrow (C_6H_5)_2CO + [MGH]^{\bullet+}$	1.5×10^9	5			p.r.	P.b.k. at 340 nm in soln. contg. 0.001 mol L^{-1} benzophenone, 0.04 mol L^{-1} phosphate buffer, 1.0 mol L^{-1} *tert*-BuOH and (4-10) × 10^{-5} mol L^{-1} dye.	94A467
30.4.12	**Methyl Green dication**							
	$(C_6H_5)_2\dot{C}OH + MEG^{2+} \rightarrow (C_6H_5)_2CO + [MEGH]^{\bullet 2+}$	1.0×10^{10}	5			p.r.	P.b.k. at 340 nm in soln. contg. 0.001 mol L^{-1} benzophenone, 0.04 mol L^{-1} phosphate buffer, 1.0 mol L^{-1} *tert*-BuOH and (4-10) × 10^{-5} mol L^{-1} dye.	94A467
30.4.13	**4-(4′-Methylphenyl)imino-3-methyl-1-phenyl-2-pyrazolin-5-one**							
	$(C_6H_5)_2\dot{C}OH + MPMPP \rightarrow (C_6H_5)_2CO +$ other products	1.1×10^9				f.p./rq	D.k. in soln. contg. ~0.001 mol L^{-1} benzophenone and 5% EtOH or 2-PrOH.	89A499
30.4.14	**Nitrobenzene**							
	$(C_6H_5)_2\dot{C}OH + C_6H_5NO_2 \rightarrow (C_6H_5)_2CO + H^+ + [C_6H_5NO_2]^{\bullet-}$	3.5×10^5			293	f.p./oq	D.k. at 542 nm in soln. contg. UO_2^{2+}, benzilic acid and 25% acetone.	80A320
30.4.15	**3-Nitrobenzoate ion**							
	$(C_6H_5)_2\dot{C}OH + 3\text{-}NO_2C_6H_4CO_2^- \rightarrow (C_6H_5)_2CO + H^+ + [3\text{-}NO_2C_6H_4CO_2]^{\bullet 2-}$	1.1×10^6			293	f.p./oq	D.k. at 542 nm in soln. contg. UO_2^{2+}, benzilic acid and 25% acetone.	80A320

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
30.4	**Benzophenone radical anion** — Continued							
30.4.16	**2,2,4,4-Tetramethyl-4-piperidinol *N*-oxyl**							
	$(C_6H_5)_2\dot{C}OH$ + TEMPOL → $(C_6H_5)_2CO$ + TEMPOL-H	8.0×10^7			293	f.p./rq	D.k. at 540-560 nm in soln. contg. (5-500) $\times 10^{-6}$ mol L^{-1} TEMPOL, ~0.001 mol L^{-1} benzophenone and 4% ethanol.	90F503
30.4.17	**2,2,4,4-Tetramethyl-4-piperidone *N*-oxyl**							
	$(C_6H_5)_2\dot{C}OH$ + TAN → $(C_6H_5)_2CO$ + TAN-H	1.2×10^8			293	f.p./rq	D.k. at 540-560 nm in soln. contg. (5-500) $\times 10^{-6}$ mol L^{-1} TAN, ~0.001 mol L^{-1} benzophenone and 4% ethanol.	90F503
30.5	**3-Benzoyl-1-methylpyridinium radical anion, protonated**							
30.5.1	**3-Benzoyl-1-methylpyridinium radical anion, protonated**							
	3-$pyCH_3^+\dot{C}(OH)C_6H_5$ + 3-$pyCH_3^+\dot{C}(OH)C_6H_5$ →	6.0×10^8	4.7			p.r.	D.k. at 530 nm in Ar-satd. soln. contg. 2.0 mol L^{-1} 2-PrOH; $\varepsilon = 3200$ L mol^{-1} cm^{-1} at 520 nm; $pK_a = 5.9$.	720359
30.6	**4-Benzoyl-1-methylpyridinium radical anion, diprotonated**							
30.6.1	**4-Benzoyl-1-methylpyridinium radical anion, diprotonated**							
	4-$pyCH_3^+\dot{C}(OH)C_6H_5$ + 4-$pyCH_3^+\dot{C}(OH)C_6H_5$ →	1.8×10^8	7			p.r.	D.k. in N_2-satd. soln. contg. 2-PrOH.	88N031
30.7	**2-Benzoylpyridine, radical anion**							
30.7.1	**2-Benzoylpyridine, radical anion**							
	2-$py\dot{C}(O^-)C_6H_5$ + 2-$py\dot{C}(O^-)C_6H_5$ →	6.0×10^7	13.3			p.r.	D.k. at 550 nm in Ar-satd. soln. contg. 2.0 mol L^{-1} 2-PrOH; $\varepsilon = 4800$ L mol^{-1} cm^{-1} at 560 nm.	720359
	2-$pyH^+\dot{C}(O^-)C_6H_5$ + 2-$pyH^+\dot{C}(O^-)C_6H_5$ →	6.0×10^7	5.9			p.r.	D.k. at 550 nm in Ar-satd. soln. contg. 2.0 mol L^{-1} 2-PrOH; $\varepsilon = 3000$ L mol^{-1} cm^{-1} at 495 nm; $pK_a = 12.3$.	720359
	2-$pyH^+\dot{C}(OH)C_6H_5$ + 2-$pyH^+\dot{C}(OH)C_6H_5$ →	4.0×10^8	1.1			p.r.	D.k. at 550 nm in Ar-satd. soln. contg. 2.0 mol L^{-1} 2-PrOH; $\varepsilon = 2300$ L mol^{-1} cm^{-1} at 540 nm; $pK_a = 3.1$; d.k. at 350 nm (ε = 37000) gave $k = 3.6 \times 10^8$ L mol^{-1} s^{-1}.	720359
30.8	**3-Benzoylpyridine radical anion, protonated**							
30.8.1	**3-Benzoylpyridine radical anion, protonated**							
	3-$pyH^+\dot{C}(O^-)C_6H_5$ + 3-$pyH^+\dot{C}(O^-)C_6H_5$ →	2.8×10^8			295	f.p./rq	D.k. at 560 nm in deaerated soln. contg. 50% 2-PrOH and 7.1×10^{-5} mol L^{-1} 3-benzoylpyridine; $\varepsilon = 3400$ L mol^{-1} cm^{-1}.	93A159
		3.8×10^8	5.1			p.r.	D.k. at 505 nm in Ar-satd. soln. contg. 2.0 mol L^{-1} 2-PrOH; $\varepsilon = 3400$ L mol^{-1} cm^{-1} at 503 nm; $pK_a = 9.2$.	720359
	3-$pyH^+\dot{C}(OH)C_6H_5$ + 3-$pyH^+\dot{C}(OH)C_6H_5$ →	3.9×10^8	0.9			p.r.	D.k. at 505 nm in Ar-satd. soln. contg. 2.0 mol L^{-1} 2-PrOH; $\varepsilon = 3400$ L mol^{-1} cm^{-1} at 503 nm, $pK_a = 4.1$.	720359
30.9	**4-Benzoylpyridine, radical anion**							
30.9.1	**4-Benzoylpyridine, radical anion**							
	4-$py\dot{C}(O^-)C_6H_5$ + 4-$py\dot{C}(O^-)C_6H_5$ →	8.5×10^7	13.2			p.r.	D.k. at 575 nm in Ar-satd. soln. contg. 2.0 mol L^{-1} 2-PrOH; $\varepsilon = 5900$ L mol^{-1} cm^{-1}.	720359
	4-$pyH^+\dot{C}(O^-)C_6H_5$ + 4-$pyH^+\dot{C}(O^-)C_6H_5$ →	4.8×10^7	5.2			p.r.	D.k. at 575 nm in Ar-satd. soln. contg. 2.0 mol L^{-1} 2-PrOH; $\varepsilon = 5600$ L mol^{-1} cm^{-1}; $pK_a = 12.0$.	720359
	4-$pyH^+\dot{C}(OH)C_6H_5$ + 4-$pyH^+\dot{C}(OH)C_6H_5$ →	5.5×10^8	0.8			p.r.	D.k. at 505 nm in Ar-satd. soln. contg. 2.0 mol L^{-1} 2-PrOH; $\varepsilon = 5800$ L mol^{-1} cm^{-1} at 510 nm, $pK_a = 4.2$; same k from d.k. at 390 or 340 nm.	720359

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
30.10	**2′-Bromoacetophenone radical anion**							
30.10.1	**First-order reaction**							
	$2\text{-}BrC_6H_4\dot{C}O^-CH_3 \rightarrow 2\text{-}{}^{\bullet}C_6H_4COCH_3 + Br^-$	$5 \times 10^5\ s^{-1}$	12			p.r.	D.k. in N_2-satd. soln. contg. *tert*-BuOH and 2′-bromoacetophenone.	81A098
	$2\text{-}BrC_6H_4\dot{C}OHCH_3 \rightarrow 2\text{-}{}^{\bullet}C_6H_4COCH_3 + Br^- + H^+$	$9 \times 10^3\ s^{-1}$	7			p.r.	D.k. in N_2-satd. soln. contg. *tert*-BuOH and 2′-bromoacetophenone.	81A098
30.11	**3′-Bromoacetophenone radical anion**							
30.11.1	**First-order reaction**							
	$3\text{-}BrC_6H_4\dot{C}O^-CH_3 \rightarrow 3\text{-}{}^{\bullet}C_6H_4COCH_3 + Br^-$	$\sim 10^2\ s^{-1}$	12			p.r.	D.k. in N_2-satd. soln. contg. 2-PrOH and 3′-bromoacetophenone.	81A098
30.12	**4′-Bromoacetophenone radical anion**							
30.12.1	**First-order reaction**							
	$4\text{-}BrC_6H_4\dot{C}O^-CH_3 \rightarrow 4\text{-}{}^{\bullet}C_6H_4COCH_3 + Br^-$	$5 \times 10^3\ s^{-1}$	12			p.r.	D.k. in N_2-satd. soln. contg. *tert*-BuOH and 4′-bromoacetophenone.	81A098
30.12.2	**4′-Nitroacetophenone**							
	$4\text{-}BrC_6H_4\dot{C}O^-CH_3$ + PNAP → $4\text{-}BrC_6H_4COCH_3 + [PNAP]^{\bullet-}$	4.8×10^9	12			p.r.	D.k., as well as p.b.k. at 550 nm in N_2-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.002 mol L^{-1} 4′-bromoacetophenone and (2-6) × 10^{-4} mol L^{-1} 4′-nitroacetophenone; ε at 545 nm $[PNAP]^{\bullet-}$ = 2900 L mol^{-1} cm^{-1}, pK_a = 2.5-2.7; ε at 445 nm (4-$BrC_6H_4\dot{C}O^-CH_3$) = 2800 L mol^{-1} cm^{-1}, pK_a = 9.2.	730122
30.13	**4-Bromobenzaldehyde radical anion**							
30.13.1	**First-order reaction**							
	$4\text{-}BrC_6H_4\dot{C}HO^- \rightarrow 4\text{-}{}^{\bullet}C_6H_4CHO + Br^-$	$4 \times 10^2\ s^{-1}$	12			p.r.	D.k. in N_2-satd. soln. contg. *tert*-BuOH or 2-PrOH and 4-bromobenzaldehyde.	81A098
30.14	**4-Bromobenzophenone radical anion**							
30.14.1	**First-order reaction**							
	$4\text{-}BrC_6H_4\dot{C}O^-C_6H_5 \rightarrow 4\text{-}{}^{\bullet}C_6H_4COC_6H_5 + Br^-$	$<7\ s^{-1}$	12			p.r.	D.k. in N_2-satd. soln. contg. 2-PrOH and 4-bromobenzophenone.	81A098
30.15	**4-Carboxybenzophenone, radical dianion**							
30.15.1	**Hydrogen ion**							
	$C_6H_5\dot{C}O^-C_6H_4\text{-}4\text{-}CO_2^- + H^+ \rightarrow C_6H_5\dot{C}(OH)C_6H_4\text{-}4\text{-}CO_2^-$	6.8×10^{10}				p.r.	D.k. at 660 nm in N_2-satd. soln. contg. 0.002 mol L^{-1} 4-carboxybenzophenone at varied $[H^+]$; k_r = 430 s^{-1}.	94A001
		5×10^{10}	5.2-7.0			f.p./rq	D.k. at 660 nm in soln. contg. 0.002 mol L^{-1} 4-carboxybenzophenone and methionine at varied $[H^+]$.	92A427
30.15.2	**Water**							
	$C_6H_5\dot{C}O^-C_6H_4\text{-}4\text{-}CO_2^- + H_2O \rightarrow C_6H_5\dot{C}(OH)C_6H_4\text{-}4\text{-}CO_2^- + OH^-$	$1.4 \times 10^4\ s^{-1}$	5.4			p.r.	D.k. at 570 nm in N_2-satd. soln. contg. 0.002 mol L^{-1} 4-carboxybenzophenone; k_r = 8.7×10^9 L mol^{-1} s^{-1}.	94A001
30.15.3	**4-Carboxybenzophenone, radical dianion**							
	$C_6H_5\dot{C}O^-C_6H_4\text{-}4\text{-}CO_2^- + C_6H_5\dot{C}O^-C_6H_4\text{-}4\text{-}CO_2^- \rightarrow$	4.9×10^6	11			f.p./rq	D.k. at 660 nm in soln. contg. 0.002 mol L^{-1} 4-carboxybenzophenone in the presence of α-methyl-4-carboxybenzhydrol; ε = 8100 L mol^{-1} cm^{-1}.	81A314
	$C_6H_5\dot{C}O^-C_6H_4\text{-}4\text{-}CO_2^- + C_6H_5\dot{C}(OH)C_6H_4\text{-}4\text{-}CO_2^- \rightarrow$	1.1×10^9	8.2			f.p./rq	D.k. at 660 nm in soln. contg. 0.002 mol L^{-1} 4-carboxybenzophenone in the presence of α-methyl-4-carboxybenzhydrol.	81A314

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
30.15	**4-Carboxybenzophenone, radical dianion** — Continued							
30.15.3	**4-Carboxybenzophenone, radical dianion** — Continued							
	$C_6H_5\dot{C}(OH)C_6H_4$-4-CO_2^- + $C_6H_5\dot{C}(OH)C_6H_4$-4-CO_2^- →	9.0×10^8	6.3			f.p./rq	D.k. at 525 nm in soln. contg. 0.002 mol L^{-1} 4-carboxybenzophenone in the presence of α-methyl-4-carboxybenzhydrol; ε = 3600 L mol^{-1} cm^{-1}; 85% disproportionation, 15% pinacol formation.	81A314
30.16	**2′-Chloroacetophenone radical anion**							
30.16.1	**First-order reaction**							
	2-$ClC_6H_4\dot{C}O^-CH_3$ → 2-$^{\cdot}C_6H_4COCH_3$ + Cl^-	$1.5 \times 10^3\ s^{-1}$	12			p.r.	D.k. in N_2-satd. soln. contg. *tert*-BuOH and 2′-chloroacetophenone.	81A098
30.17	**4′-Chloroacetophenone radical anion**							
30.17.1	**First-order reaction**							
	4-$ClC_6H_4\dot{C}O^-CH_3$ → 4-$^{\cdot}C_6H_4COCH_3$ + Cl^-	$\sim 10^2\ s^{-1}$	12			p.r.	D.k. in N_2-satd. soln. contg. 2-PrOH and 4′-chloroacetophenone.	81A098
30.17.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	4-$ClC_6H_4\dot{C}OHCH_3$ + MV^{2+} → 4-$ClC_6H_4COCH_3$ + $MV^{\cdot+}$ + H^+	3.6×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4′-chloroacetophenone and methyl viologen.	84B033
30.17.3	**4′-Nitroacetophenone**							
	4-$ClC_6H_4\dot{C}O^-CH_3$ + PNAP → 4-$ClC_6H_4COCH_3$ + $[PNAP]^{\cdot-}$	5.1×10^9	12			p.r.	D.k., as well as p.b.k. at 550 nm in N_2-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.002 mol L^{-1} 4′-chloroacetophenone and (2-6) × 10^{-4} mol L^{-1} 4′-nitroacetophenone; ε at 545 nm $[PNAP]^{\cdot-}$ = 2900 L mol^{-1} cm^{-1}, pK_a = 2.5-2.7; ε at 445 nm (4-$ClC_6H_4\dot{C}O^-CH_3$) =3100 L mol^{-1} cm^{-1}, pK_a = 9.35.	730122
30.18	**4-Chlorobenzoate radical anion**							
30.18.1	**First-order reaction**							
	4-$ClC_6H_4\dot{C}O_2^{2-}$ → 4-$^-O_2CC_6H_4^{\cdot}$ + Cl^-	$4 \times 10^7\ s^{-1}$	12			p.r.	D.k. at 420 nm in N_2-satd. soln. contg. *tert*-BuOH and 4-chlorobenzoate ion.	81A098
30.19	**4-Chlorobenzophenone radical anion, protonated**							
30.19.1	**First-order reaction**							
	4-$ClC_6H_4\dot{C}OHC_6H_5$ → H^+ + 4-$ClC_6H_4\dot{C}O^-C_6H_5$	$9.8 \times 10^6\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4-chlorobenzophenone.	86A248
30.19.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	4-$ClC_6H_4\dot{C}OHC_6H_5$ + MV^{2+} → 4-$ClC_6H_4COC_6H_5$ + $MV^{\cdot+}$ + H^+	7.3×10^8				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4-chlorobenzophenone and methyl viologen.	84B033
30.20	**3′-(Chloromethyl)acetophenone radical anion**							
30.20.1	**First-order reaction**							
	3-$(ClCH_2)C_6H_4\dot{C}O^-CH_3$ → 3-$CH_3COC_6H_4\dot{C}H_2$ + Cl^-	$1.5 \times 10^4\ s^{-1}$	12			p.r.	D.k. at 300-320 and 460 nm, as well as p.b.k. at 340-400 nm, in N_2-satd. soln. contg. *tert*-BuOH or 2-PrOH and *m*-(chloromethyl)acetophenone.	81A098

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T (K)	Method	Comment	Ref.
30.21	**4′-Cyanoacetophenone radical anion, protonated**							
30.21.1	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$4\text{-}CNC_6H_4\dot{C}OHCH_3 + MV^{2+} \rightarrow$ $4\text{-}CNC_6H_4COCH_3 + MV^{\bullet+} + H^+$	1.3×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4-cyanoacetophenone and methyl viologen.	84B033
30.22	**4,4′-Dichlorobenzophenone radical anion, protonated**							
30.22.1	**First-order reaction**							
	$(4\text{-}ClC_6H_4)_2\dot{C}OH \rightarrow H^+ +$ $(4\text{-}ClC_6H_4)_2\dot{C}O^-$	$\geq 1.5 \times 10^7\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.036 mol L^{-1} triethylamine and 4,4′-dichlorobenzophenone.	86A248
30.22.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$(4\text{-}ClC_6H_4)_2\dot{C}OH + MV^{2+} \rightarrow$ $(4\text{-}ClC_6H_4)_2CO + MV^{\bullet+} + H^+$	4.3×10^8				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4,4′-dichlorobenzophenone and methyl viologen.	84B033
30.23	**4,4′-Dimethoxybenzophenone radical anion, protonated**							
30.23.1	**First-order reaction**							
	$(4\text{-}CH_3OC_6H_4)_2\dot{C}OH \rightarrow H^+ +$ $(4\text{-}CH_3OC_6H_4)_2\dot{C}O^-$	$7.4 \times 10^6 s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.14 mol L^{-1} triethylamine and 4,4′-dimethoxybenzophenone.	86A248
30.23.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$(4\text{-}CH_3OC_6H_4)_2\dot{C}OH + MV^{2+} \rightarrow$ $(4\text{-}CH_3OC_6H_4)_2CO + MV^{\bullet+} + H^+$	5.1×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4,4′-dimethoxybenzophenone and methyl viologen.	84B033
30.24	**4′-Fluoroacetophenone radical anion, protonated**							
30.24.1	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$4\text{-}FC_6H_4\dot{C}OHCH_3 + MV^{2+} \rightarrow$ $4\text{-}FC_6H_4COCH_3 + MV^{\bullet+} + H^+$	4.0×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4-fluoroacetophenone and methyl viologen.	84B033
30.24.2	**4′-Nitroacetophenone**							
	$4\text{-}FC_6H_4\dot{C}O^-CH_3 + PNAP \rightarrow$ $4\text{-}FC_6H_4COCH_3 + [PNAP]^{\bullet-}$	4.9×10^9	11			p.r.	D.k., as well as p.b.k. at 550 nm in N_2-satd. soln. contg. 1 mol L^{-1} *tert*-BuOH, 0.002 mol L^{-1} 4-fluoroacetophenone and (2-6) × 10^{-4} mol L^{-1} 4-nitroacetophenone; ε at 545 nm $[PNAP]^{\bullet-} = 2900\ L\ mol^{-1}\ cm^{-1}$, $pK_a = 2.5\text{-}2.7$; ε at 445 nm ($4\text{-}FC_6H_4\dot{C}O^-CH_3$) = $2000\ L\ mol^{-1}\ cm^{-1}$, $pK_a = 9.7$.	730122
30.25	**4-Fluorobenzoate radical anion**							
30.25.1	**First-order reaction**							
	$4\text{-}FC_6H_4\dot{C}O_2^{2-} \rightarrow 4\text{-}^-O_2CC_6H_4^{\bullet} + F^-$	$6 \times 10^5\ s^{-1}$	12			p.r.	D.k. in N_2-satd. soln. contg. *tert*-BuOH and 4-fluorobenzoate ion.	81A098

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
30.26	**4-Fluorobenzophenone radical anion, protonated**							
30.26.1	**First-order reaction**							
	$4\text{-}FC_6H_4\dot{C}OHC_6H_5 \rightarrow H^+ + 4\text{-}FC_6H_4\dot{C}O^-C_6H_5$	$8.5 \times 10^6\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4-fluorobenzophenone.	86A248
30.26.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$4\text{-}FC_6H_4\dot{C}OHC_6H_5 + MV^{2+} \rightarrow 4\text{-}FC_6H_4COC_6H_5 + MV^{\cdot+} + H^+$	1.2×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4-fluorobenzophenone and methyl viologen.	84B033
30.27	**Hydroxy(phenyl)methyl**							
30.27.1	**4-Chlorobenzenediazonium cation**							
	$C_6H_5\dot{C}HOH + 4\text{-}ClC_6H_4N_2^+ \rightarrow C_6H_5CHO + 4\text{-}ClC_6H_4 + N_2 + H^+$	4.1×10^5				γ-r.	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol L^{-1} benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	80G099
30.27.2	**4-Cyanobenzenediazonium ion**							
	$C_6H_5\dot{C}HOH + 4\text{-}CNC_6H_4N_2^+ \rightarrow C_6H_5CHO + 4\text{-}CNC_6H_4 + N_2 + H^+$	9.1×10^5				γ-r.	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol L^{-1} benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	80G099
30.27.3	**4-Methoxybenzenediazonium cation**							
	$C_6H_5\dot{C}HOH + 4\text{-}CH_3OC_6H_4N_2^+ \rightarrow C_6H_5CHO + 4\text{-}CH_3OC_6H_4 + N_2 + H^+$	1.5×10^5				γ-r.	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol L^{-1} benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	80G099
30.27.4	**4-Methylbenzenediazonium cation**							
	$C_6H_5\dot{C}HOH + 4\text{-}CH_3C_6H_4N_2^+ \rightarrow C_6H_5CHO + 4\text{-}CH_3C_6H_4 + N_2 + H^+$	2.9×10^5				γ-r.	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol L^{-1} benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	80G099
30.27.5	**4-Nitrobenzenediazonium ion**							
	$C_6H_5\dot{C}HOH + 4\text{-}NO_2C_6H_4N_2^+ \rightarrow C_6H_5CHO + 4\text{-}NO_2C_6H_4 + N_2 + H^+$	1.5×10^6				γ-r.	Calcd. from concn. and dose rate effects on yields in soln. contg. 0.01-0.04 mol L^{-1} benzyl alcohol and diazonium ions; assumed $2k(R + R) = 1 \times 10^9$ L $mol^{-1}\ s^{-1}$.	80G099
30.28	**4-(2-Hydroxy-3-sulfopropoxy)benzophenone radical anion, protonated**							
30.28.1	**4-(2-Hydroxy-3-sulfopropoxy)benzophenone radical anion, protonated**							
	$C_6H_5\dot{C}OHC_6H_4OCH_2CHOHCH_2SO_3^- + C_6H_5\dot{C}OHC_6H_4OCH_2CHOHCH_2SO_3^- \rightarrow$	1.9×10^8	7			p.r.	D.k. at 540 nm in soln. contg. 5×10^{-4} mol L^{-1} benzophenone and 5% 2-PrOH; ε = 3660 L $mol^{-1}\ cm^{-1}$; radical mixt. contains $(CH_3)_2\dot{C}OH$.	88F197
30.29	**4-[2-Hydroxy-3-trimethylammonio)propoxy]benzophenone radical anion, protonated**							
30.29.1	**4-[2-Hydroxy-3-trimethylammonio)propoxy]benzophenone radical anion, protonated**							
	$C_6H_5\dot{C}OHC_6H_4OCH_2CHOHCH_2N^+(CH_3)_3 + C_6H_5\dot{C}OHC_6H_4OCH_2CHOHCH_2N^+(CH_3)_3 \rightarrow$	1.4×10^8	7			p.r.	D.k. at 540 nm in soln. contg. 5×10^{-4} mol L^{-1} benzophenone and 5% 2-PrOH; ε = 4050 L $mol^{-1}\ cm^{-1}$; radical mixt. contains $(CH_3)_2\dot{C}OH$.	88F197
30.30	**4′-Iodoacetophenone radical anion**							
30.30.1	**First-order reaction**							
	$4\text{-}IC_6H_4\dot{C}O^-CH_3 \rightarrow 4\text{-}^{\cdot}C_6H_4COCH_3 + I^-$	$1.4 \times 10^5\ s^{-1}$	12			p.r.	D.k. in N_2-satd. soln. contg. *tert*-BuOH and 4′-iodoacetophenone.	81A098

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
30.30	**4′-Iodoacetophenone radical anion** — Continued							
30.30.1	**First-order reaction** — Continued							
	$4\text{-}IC_6H_4\dot{C}OHCH_3 \rightarrow 4\text{-}{}^{\cdot}C_6H_4COCH_3 + I^-$	$4 \times 10^3\ s^{-1}$	4			p.r.	D.k. in N_2-satd. soln. contg. *tert*-BuOH and 4′-iodoacetophenone.	81A098
30.30.2	**Hydrogen ion**							
	$4\text{-}IC_6H_4\dot{C}O^-CH_3 + H^+ \rightarrow 4\text{-}IC_6H_4\dot{C}OHCH_3$	2×10^{10}	4			p.r.	D.k. at 310-330 nm in N_2-satd. soln. contg. *tert*-BuOH and 4′-iodoacetophenone.	81A098
30.31	**4′-Methoxyacetophenone radical anion, protonated**							
30.31.1	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$4\text{-}CH_3OC_6H_4\dot{C}OHCH_3 + MV^{2+} \rightarrow$ p-MAP + $MV^{\cdot+} + H^+$	5.4×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4-methoxyacetophenone and methyl viologen.	84B033
30.32	**4-Methoxybenzophenone radical anion, protonated**							
30.32.1	**First-order reaction**							
	$4\text{-}CH_3OC_6H_4\dot{C}OHC_6H_5 \rightarrow H^+ + 4\text{-}CH_3OC_6H_4\dot{C}O^-C_6H_5$	$7.4 \times 10^6\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.14 mol L^{-1} triethylamine and 4-methoxybenzophenone.	86A248
30.32.2	**1,4-Diazabicyclo[2.2.2]octane radical cation**							
	$4\text{-}CH_3OC_6H_4\dot{C}O^-C_6H_5 + DABCO^{\cdot+} \rightarrow 4\text{-}CH_3OC_6H_4COC_6H_5 + DABCO$	8.1×10^9				f.p./rq	D.k. at 625 nm in 1:9 water/acetonitrile soln. contg. *0.02 mol L^{-1} NaOH, 0.05 mol* L^{-1} DABCO and 4-methoxybenzophenone; used ε(radical anion) = 6000 L mol^{-1} cm^{-1}.	86A248
30.32.3	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$4\text{-}CH_3OC_6H_4\dot{C}OHC_6H_5 + MV^{2+} \rightarrow 4\text{-}CH_3OC_6H_4COC_6H_5 + MV^{\cdot+} + H^+$	3.3×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4-methoxybenzophenone and methyl viologen.	84B033
30.33	**4′-Methylacetophenone radical anion, protonated**							
30.33.1	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$4\text{-}CH_3C_6H_4\dot{C}OHCH_3 + MV^{2+} \rightarrow 4\text{-}CH_3C_6H_4COCH_3 + MV^{\cdot+} + H^+$	4.6×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4-methylacetophenone and methyl viologen.	84B033
30.34	**4-Methylbenzophenone radical anion, protonated**							
30.34.1	**First-order reaction**							
	$4\text{-}CH_3C_6H_4\dot{C}OHC_6H_5 \rightarrow H^+ + 4\text{-}CH_3C_6H_4\dot{C}O^-C_6H_5$	$7.3 \times 10^6\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.072 mol L^{-1} triethylamine and 4-methylbenzophenone.	86A248
30.34.2	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$4\text{-}CH_3C_6H_4\dot{C}OHC_6H_5 + MV^{2+} \rightarrow 4\text{-}CH_3C_6H_4COC_6H_5 + MV^{\cdot+} + H^+$	2.8×10^9				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4-methylbenzophenone and methyl viologen.	84B033

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k ($L\ mol^{-1}\ s^{-1}$)	pH	I	T(K)	Method	Comment	Ref.
30.35	**4-Sulfomethylbenzophenone radical anion, protonated**							
30.35.1	**4-Sulfomethylbenzophenone radical anion**							
	$C_6H_5\dot{C}OHC_6H_4CH_2SO_3^- + C_6H_5\dot{C}O^-C_6H_4CH_2SO_3^- \rightarrow$	6.3×10^6	alk.			f.p./rq	D.k. at 618 nm in soln. contg. 2% EtOH, 0.005 mol L^{-1} ketone and 0.05 mol L^{-1} NaOH; $\varepsilon = 1100\ L\ mol^{-1}\ cm^{-1}$; $pK_a = 11.8$; $k = 2.0 \times 10^6\ L\ mol^{-1}\ s^{-1}$ in 50% EtOH.	90A060
		8.3×10^6	alk.			f.p./rq	D.k. at 630 nm in soln. contg. 2% MeOH, 0.005 mol L^{-1} ketone and 0.05 mol L^{-1} NaOH; $\varepsilon = 1100\ L\ mol^{-1}\ cm^{-1}$; $pK_a = 11.8$; $k = 6.2 \times 10^6\ L\ mol^{-1}\ s^{-1}$ in 50% MeOH.	90A060
		8.1×10^6	alk.			f.p./rq	D.k. at 630 nm in soln. contg. 1% 2-PrOH, 0.005 mol L^{-1} ketone and 0.05 mol L^{-1} NaOH; $\varepsilon = 1100\ L\ mol^{-1}\ cm^{-1}$; $pK_a = 11.8$; $k = 1.5 \times 10^6\ L\ mol^{-1}\ s^{-1}$ in 60% 2-PrOH; k decreases with increasing 2-PrOH concn.	90A060
	$C_6H_5\dot{C}OHC_6H_4CH_2SO_3^- + C_6H_5\dot{C}OHC_6H_4CH_2SO_3^- \rightarrow$	1.4×10^8 3.2×10^8	7			p.r.	D.k. at 540 nm in soln. contg. 5×10^{-4} mol L^{-1} benzophenone and 5% 2-PrOH; $\varepsilon = 3215\ L\ mol^{-1}\ cm^{-1}$; radical mixt. contains $(CH_3)_2\dot{C}OH$.	88F197 88N031
30.36	**3,3′,4,4′-Tetracarboxybenzophenone tetraanion, radical anion**							
30.36.1	**3,3′,4,4′-Tetracarboxybenzophenone tetraanion, radical anion**							
	$(3,4\text{-}CO_2^-C_6H_3)_2\dot{C}O^- + (3,4\text{-}CO_2^-C_6H_3)_2\dot{C}O^- \rightarrow$	1.1×10^2	12		293	f.p./rq	D.k. at 710 nm in soln. contg. 10^{-4} mol L^{-1} 3,3′,4,4′-tetracarboxybenzophenone and 10% ethanol or glycerol; $\varepsilon = 6300\ L\ mol^{-1}\ cm^{-1}$.	83A339
	$(3,4\text{-}CO_2^-C_6H_3)_2\dot{C}OH + (3,4\text{-}CO_2^-C_6H_3)_2\dot{C}OH \rightarrow$	5×10^5	7		293	f.p./rq	D.k. at 600 nm in soln. contg. 10^{-4} mol L^{-1} 3,3′,4,4′-tetracarboxybenzophenone and 10% ethanol or glycerol; $pK_a = 8.5$; $\varepsilon = 2400\ L\ mol^{-1}\ cm^{-1}$.	83A339
30.36.2	**Ferricyanide ion**							
	$(3,4\text{-}CO_2^-C_6H_3)_2\dot{C}OH + Fe(CN)_6^{3-} \rightarrow (3,4\text{-}CO_2^-C_6H_3)_2CO + Fe(CN)_6^{4-} + H^+$	8.0×10^6	7		293	f.p./rq	D.k. at 600 nm in soln. contg. 10^{-4} mol L^{-1} 3,3′,4,4′-tetracarboxybenzophenone, 3×10^{-5} mol L^{-1} ferricyanide and 10% ethanol; same value at pH 12.	83A339
30.36.3	**Oxygen**							
	$(3,4\text{-}CO_2^-C_6H_3)_2\dot{C}OH + O_2 \rightarrow (3,4\text{-}CO_2^-C_6H_3)_2CO + O_2^{\bullet-} + H^+$	4×10^7	7		293	f.p./rq	D.k. at 600 nm in soln. contg. 10^{-4} mol L^{-1} 3,3′,4,4′-tetracarboxybenzophenone, 3×10^{-5} mol L^{-1} ferricyanide and 10% ethanol; same value at pH 12.	83A339
30.36.4	**2,2,6,6-Tetramethyl-4-piperidone *N*-oxyl**							
	$(3,4\text{-}CO_2^-C_6H_3)_2\dot{C}OH + TAN \rightarrow (3,4\text{-}CO_2^-C_6H_3)_2CO + TAN\text{-}H$	1.3×10^7	7		293	f.p./rq	D.k. at 600 nm in soln. contg. 10^{-4} mol L^{-1} 3,3′,4,4′-tetracarboxybenzophenone, 3×10^{-5} mol L^{-1} ferricyanide and 10% ethanol; same value at pH 12.	83A339
30.37	**4-(Trifluoromethyl)benzophenone radical anion, protonated**							
30.37.1	**First-order reaction**							
	$4\text{-}CF_3C_6H_4\dot{C}OHC_6H_5 \rightarrow H^+ + 4\text{-}CF_3C_6H_4\dot{C}O^-C_6H_5$	$\geq 1.5 \times 10^7\ s^{-1}$				f.p./rq	P.b.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.036 mol L^{-1} triethylamine and 4-(trifluoromethyl)benzophenone.	86A248
30.37.2	**1,4-Diazabicyclo[2.2.2]octane radical cation**							
	$4\text{-}CF_3C_6H_4\dot{C}O^-C_6H_5 + DABCO^{\bullet+} \rightarrow 4\text{-}CF_3C_6H_4COC_6H_5 + DABCO$	1.0×10^{10}				f.p./rq	D.k. at 625 nm in 1:9 water/acetonitrile soln. contg. 0.02 mol L^{-1} NaOH, 0.05 mol L^{-1} DABCO and 4-(trifluoromethyl)benzophenone; used ε(radical anion) = 6000 $L\ mol^{-1}\ cm^{-1}$.	86A248

TABLE 30. α-Hydroxybenzyl radicals — Continued

No.	Reaction	k (L mol^{-1} s^{-1})	pH	I	T(K)	Method	Comment	Ref.
30.37	**4-(Trifluoromethyl)benzophenone radical anion, protonated** — Continued							
30.37.3	**1,1′-Dimethyl-4,4′-bipyridinium**							
	$4\text{-}CF_3C_6H_4\dot{C}OHC_6H_5 + MV^{2+} \rightarrow$ $4\text{-}CF_3C_6H_4COC_6H_5 + MV^{\cdot+} + H^+$	2.5×10^8				f.p./rq	P.b.k. at 610 nm in 1:9 (v/v) water-acetonitrile soln. contg. 0.5-0.1 mol L^{-1} 4-methoxyphenol, 4-trifluoromethylbenzophenone and methyl viologen.	84B033
30.38	**2-[3-(*N,N-N*-Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene radical anion, protonated**							
30.38.1	**2-[3-(*N,N-N*-Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene radical anion, protonated**							
	$TXH^{\cdot+} + TXH^{\cdot+} \rightarrow$	3.8×10^8	7			p.r.	D.k. at 360 nm in soln. contg. 2-[3-(trimethylammonio)-2-hydroxypropyl)-3,4-dimethyl-9-oxothioxanthene; pK_a = 9.8.	88A109
	$TX^{\cdot} + TX^{\cdot} \rightarrow$	5.5×10^8	12			p.r.	D.k. at 360 nm in soln. contg. 2-[3-(trimethylammonio)-2-hydroxypropyl)-3,4-dimethyl-9-oxothioxanthene.	88A109
30.39	**4-Trimethylammoniomethylbenzophenone radical anion, protonated**							
30.39.1	**4-Trimethylammoniomethylbenzophenone radical anion, protonated**							
	$C_6H_5\dot{C}OHC_6H_4CH_2N(CH_3)_3^+ +$ $C_6H_5\dot{C}OHC_6H_4CH_2N(CH_3)_3^+ \rightarrow$	2.4×10^8	7			p.r.	D.k. at 540 nm in soln. contg. 5×10^{-4} mol L^{-1} benzophenone and 5% 2-PrOH; ε = 4500 L mol^{-1} cm^{-1}; radical mixt. contains $(CH_3)_2\dot{C}OH$.	88F197 88N031

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10. Molecular Formula Index

$C_8H_{10}N_2O$ *N,N*-Dimethyl-4-nitrosoaniline *12.130, 13.97, 16.364, 26.231*

$C_8H_{10}N_3^+$ 4-(*N,N*-Dimethylamino)benzenediazonium cation *12.128*

$C_8H_{11}NO_2$ 3,4-Dihydroxyphenethylamine *30.2.1*

$C_8H_{11}NO_3$ 5-Hydroxydopamine *21.33*
6-Hydroxydopamine *21.34*
Noradrenaline *21.43*
Pyridoxine *16.550*

$C_8H_{11}NO_6P^+$
Pyridoxal 5-phosphate, conjugate acid *16.548*

$C_8H_{12}CuN_4O_3$
Glycylhistidinecopper(II) complex *26.79*

$C_8H_{12}NO^+$ 1-Ethoxy-2-methylpyridinium *26.244*

$C_8H_{12}NO_2$ Norpseudopelletierine *N*-oxyl *16.504, 17.86*

$C_8H_{12}N_3O_5$ Radicals from acetyltriglycine *27.209*

$C_8H_{13}N_3O_4S$
1-(2-Ethylsulfonyl)ethyl-2-methyl-5-nitroimidazole *26.248*

$C_8H_{13}O_2S_2^-$ 1,2-Dithiolane-3-pentanoate ion *13.99, 16.382, 26.241, 27.28.7*

$C_8H_{14}Br_2CoN_4O_4^-$
Dibromobis(dimethylglyoximato)cobaltate(III) ion *2.17*

$C_8H_{14}Cl_2CoN_4O_4^-$
Dichlorobis(dimethylglyoximato)cobaltate(III) ion *2.18*

$C_8H_{14}N_3O_4S^+$
1-(2-Ethylsulfonyl)ethyl-2-methyl-5-nitroimidazole, conjugate acid *26.249*

$C_8H_{15}NOS_2$ Lipoamide *12.152, 13.113, 16.422, 17.79, 26.275*

$C_8H_{15}O$ 1-Hydroxycyclooctyl *27.149*

$C_8H_{16}BrCoN_4O_5$
Aquabromobis(dimethylglyoximato)cobalt(III) *16.105*

$C_8H_{16}ClCoN_4O_5$
Aquachlorobis(dimethylglyoximato)cobalt(III) *16.106, 2.16*

C_8H_{17} 1-Methylheptyl *6.10*
Octyl *6.13*

$C_8H_{17}NO_2S$ Dihydrolipoamide *26.217*

$C_8H_{19}CoN_6O_2^{2+}$
Pentaammine(4-cyanobenzoato)cobalt(III) ion *26.34*

$C_8H_{20}CoN_7O_6^{2+}$
Pentaammine(2,4-dinitrophenylacetato)cobalt(III) ion *16.40, 26.43*

$C_8H_{21}CoN_6O_3^{2+}$
Pentaammine(carboxymethyl 4-pyridinecarboxylato)cobalt(III) ion *16.62*

$C_8H_{21}CoN_6O_4^{2+}$
Pentaammine(2-nitrophenylacetato)cobalt(III) ion *16.37, 26.40*
Pentaammine(3-nitrophenylacetato)cobalt(III) ion *16.38, 26.41*
Pentaammine(4-nitrophenylacetato)cobalt(III) ion *16.39, 26.42*

$C_8H_{22}CoN_5O_2^{2+}$
Pentaammine(phenylacetato)cobalt(III) ion *26.32*

$C_8H_{22}CoN_7O_4^{2+}$
Pentaammine(4-nitrophenylglycinato)cobalt(III) ion *16.42*

$C_8H_{23}CoN_7O_3^{3+}$
Pentaammine[4-(aminocarbonyl)-1-(carboxymethyl)pyridinio]cobalt(III) ion *16.63*

$C_8H_{28}CoN_6^{3+}$
Bis(ethylenediamine)(1,4-diaminobutane)cobalt(III) ion *16.81*

$C_8H_{34}Co_2N_9O_2^{4+}$
μ-Amido-μ-superoxidotetrakis-(ethylenediamine)dicobalt(III) ion *12.32, 13.24, 16.116, 26.65*

$C_9H_5O_3^-$ 7-Hydroxycoumarin, conjugate base *21.32*

$C_9H_5O_4^-$ 6,7-Dihydroxycoumarin, conjugate base *21.20*

$C_9H_5O_4^{3-}$ 3,4-Dihydroxycinnamate ion, conjugate dibase *21.19*

$C_9H_6O_3^{2-}$ *p*-Hydroxycinnamate ion, conjugate base *21.31*

C_9H_8NO 4′-Cyanoacetophenone radical anion, protonated *30.21*

$C_9H_8O_4^-$ 2-Carboxy-2-hydroxy-1-(4-hydroxyphenyl)ethyl, anion *29.1*

$C_9H_8O_5^-$ 4-Carboxy-2,6-dimethoxyphenoxyl, anion *17.59*

$C_9H_9ClO^-$ 3′-(Chloromethyl)acetophenone radical anion *30.20*

$C_9H_{10}O_2$ 2,3,5-Trimethyl-1,4-benzoquinone *16.582*

$C_9H_{11}NO_3$ Tyrosine *26.364*

$C_9H_{11}NO_4$ DL-DOPA *21.24*

$C_9H_{11}O$ 2,4,6-Trimethylphenoxyl *17.95*
4′-Methylacetophenone radical anion, protonated *30.33*

$C_9H_{11}O_2$ 4′-Methoxyacetophenone radical anion, protonated *30.31*

$C_9H_{14}CuN_4O_3$
β-Alanylhistidinecopper(II) complex *26.80*

$C_{14}H_6O_4^{2-}$ 1,4-Dihydroxy-9,10-anthraquinone dianion *16.354*
1,5-Dihydroxy-9,10-anthraquinone dianion *26.218*
1,8-Dihydroxy-9,10-anthraquinone dianion *26.220*
2,6-Dihydroxy-9,10-anthraquinone dianion *26.222*

$C_{14}H_6O_8S_2^{2-}$ 9,10-Anthraquinone-1,5-disulfonate ion *26.182*
9,10-Anthraquinone-2,6-disulfonate ion *16.289, 24.7, 25.5, 26.183, 27.234.1, 27.41.4*

$C_{14}H_7O_3^-$ 2-Hydroxy-9,10-anthraquinone monoanion *26.264*

$C_{14}H_7O_4^-$ 1,4-Dihydroxy-9,10-anthraquinone, monoanion *16.353*
1,5-Dihydroxy-9,10-anthraquinone monoanion *26.219*
1,8-Dihydroxy-9,10-anthraquinone monoanion *26.221*

$C_{14}H_7O_5S^-$ 9,10-Anthraquinone-1-sulfonate ion *26.184*
9,10-Anthraquinone-2-sulfonate ion *16.290, 23.10, 25.6, 26.185, 27.234.2, 27.41.5, 30.4.3*

$C_{14}H_7O_6^-$ 1,2,5,8-Tetrahydroxyanthraquinone, conjugate base *21.49*

$C_{14}H_7O_7S^-$ 1,4-Dihydroxy-9,10-anthraquinone-2-sulfonate ion *21.17, 26.223*
1,4-Dihydroxy-9,10-anthraquinone-6-sulfonate ion *21.18*

$C_{14}H_8NO_3^-$ 1-Amino-4-hydroxyanthraquinone, conjugate base *26.181*

$C_{14}H_8O_2$ 9,10-Anthraquinone *16.288, 27.41.3*

$C_{14}H_8O_3$ 1-Hydroxyanthraquinone *16.402*

$C_{14}H_8O_4$ 1,4-Dihydroxyanthraquinone *16.352*

$C_{14}H_9F_3O$ 4-(Trifluoromethyl)benzophenone *27.82.9*

$C_{14}H_9F_3O^-$ 4-(Trifluoromethyl)benzophenone radical anion *30.37*

$C_{14}H_9NO_2$ 1-Aminoanthraquinone *16.281*

$C_{14}H_9NO_3$ 1-Amino-4-hydroxyanthraquinone *16.283*

$C_{14}H_9O_3^-$ 4-Carboxybenzophenone, conjugate base *26.203, 27.28.3*

$C_{14}H_9O_3^{2-}$ 4-Carboxybenzophenone, radical dianion *30.15*

$C_{14}H_{10}F_3O$ 4-(Trifluoromethyl)benzophenone radical anion, protonated *30.37*

$C_{14}H_{10}N_2O_2$ 1,4-Diaminoanthraquinone *16.342*

$C_{14}H_{10}O_3^-$ 4-Carboxybenzophenone radical anion, protonated *30.15*

$C_{14}H_{11}O_4S^{2-}$ 4-Sulfomethylbenzophenone radical anion *30.35*

$C_{14}H_{12}N_3O_2^-$ 5-Deazalumiflavin anion *16.338, 26.211*

$C_{14}H_{12}O$ 4-Methylbenzophenone *27.82.7*

$C_{14}H_{12}O_2$ 4-Methoxybenzophenone *27.82.6*

$C_{14}H_{12}O_2^-$ 4-Methoxybenzophenone radical anion *30.32*

$C_{14}H_{12}O_4S^-$ 4-Sulfomethylbenzophenone radical anion, protonated *30.35*

$C_{14}H_{13}N_3O_2$ 5-Deazalumiflavin *16.337, 26.210*

$C_{14}H_{13}O$ 4-Methylbenzophenone radical anion, protonated *30.34*

$C_{14}H_{13}O_2$ 4-Methoxybenzophenone radical anion, protonated *30.32*

$C_{14}H_{14}N_3^+$ 3,6-Diamino-10-methylacridinium *26.212*

$C_{14}H_{14}N_3O_2^+$ 5-Deazalumiflavin, protonated *16.336, 26.209*

$C_{14}H_{14}N_4O_2$ 1,3-Dimethyllumichrome *17.70, 26.230*

$C_{14}H_{16}N_2^{2+}$ 1,1′-Ethylene-4,4′-dimethyl-2,2′-bipyridinium *16.389, 26.246*
1,1′-Tetramethylene-2,2′-bipyridinium *16.563, 26.351*

$C_{14}H_{16}O_4^{2-}$ 6-Hydroxy-2,5,7,8-tetramethylchroman-2-carboxylate dianion *21.37*

$C_{14}H_{17}O_4$ 2-Carboxy-2,5,7,8-tetramethyl-6-chromanoxy *17.60*

$C_{14}H_{18}FeN_3O_{10}^{2-}$ Diethylenetriaminepentaacetatoferrate(III) ion *12.46, 26.95*

$C_{14}H_{18}N_2O_2^{2+}$ 1,1′-Bis(2-hydroxyethyl)-4,4′-bipyridinium *26.195*

$C_{14}H_{19}FeN_3O_{11}^{3-}$ Diethylenetriaminepentaacetato(hydroxy)ferrate(III) ion *26.96*

$C_{14}H_{24}CoN_4^{2+}$ 2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(II) ion *1.5, 16.13, 26.11*

$C_{14}H_{24}N_6NiO_2^{2+}$ 3,14-Dimethyl-4,7,10,13-tetraazahexadeca-3,13-diene-2,15-dione dioximatonickel(IV) ion *12.69, 13.51, 16.207, 26.135*

$C_{14}H_{26}CoN_4O_2^+$ Dihydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion *16.86*

$C_{14}H_{27}CoN_4O_2^{2+}$
(Aqua)hydroxy(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene)cobalt(III) ion *16.87*

$C_{14}H_{28}CoN_4O_2^{3+}$
2,3,9,10-Tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraenecobalt(III) ion *16.88, 26.52*

$C_{14}H_{32}N_4Ni^{+}$
1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(I) ion *28.7, 4.6, 5.5, 6.17.1, 6.4.2, 6.8.2*

$C_{14}H_{32}N_4Ni^{2+}$
1,4,8,11-Tetramethyl-1,4,8,11-tetraazacyclotetradecanenickel(II) ion *26.131*

$C_{15}H_9O_7^{-}$ Quercetin, conjugate base *21.47*

$C_{15}H_{11}O_2$ Flavone-8-methyl *29.5*

$C_{15}H_{12}NO_2S^{-}$
Metiazinic acid, conjugate base *21.42*

$C_{15}H_{13}O_6^{-}$ Catechin, conjugate base *21.15*

$C_{15}H_{14}O_3$ 4,4′-Dimethoxybenzophenone *27.82.4*

$C_{15}H_{15}NO_4$ 1-Ethoxycarbonyl-5-methyl-2,3-trimethyleneisoindole-4,7-dione *16.387*

$C_{15}H_{15}O_3$ 4,4′-Dimethoxybenzophenone radical anion, protonated *30.23*

$C_{15}H_{16}N_3S^{+}$ Toluidine Blue cation *12.199, 13.156, 16.578, 17.91, 27.123.1, 27.222.2, 27.241.9*

$C_{15}H_{17}N_4^{+}$ Neutral Red cation *16.465*

$C_{15}H_{18}N_2^{2+}$ 4,4′-Dimethyl-1,1′-trimethylene-2,2′-bipyridinium *16.371, 26.233*

$C_{15}H_{18}N_4O_5$ Mitomycin C *26.297*

$C_{15}H_{21}N_3O$ Primaquine *16.514, 26.335*

$C_{15}H_{23}CoN_4O_5$
Aqua(benzyl)bis(dimethylglyoximato)cobalt(III) *16.102, 19.17, 26.56*

$C_{15}H_{24}CoN_4O_5^{+}$
Aqua(benzyl)bis(dimethylglyoximato)cobalt(III), protonated *16.103, 19.18*

$C_{16}H_6N_2O_{14}S_4^{4-}$
Indigotetrasulfonate ion *12.147, 16.411, 25.12*

$C_{16}H_8N_2O_8S_2^{2-}$
Indigodisulfonate ion *12.146, 16.410, 25.11, 26.273*

$C_{16}H_{10}$ Pyrene *12.191, 13.145, 16.525*

$C_{16}H_{13}NO_2$ 1,2-Dimethyl-3-phenylisoindole-4,7-dione *16.365*
2,5-Dimethyl-3-phenylisoindole-4,7-dione *16.366*

$C_{16}H_{16}O_6S^{-}$ 4-(2-Hydroxy-3-sulfopropoxy)benzophenone radical anion, protonated *30.28*

$C_{16}H_{18}N_2O_4^{2+}$
1,1′-Bis(carboxyethyl)-4,4′-bipyridinium *26.193*

$C_{16}H_{18}N_3S^{+}$ Methylene Blue cation *12.160, 16.439, 25.14, 26.283*

$C_{16}H_{20}N_2^{2+}$ 4,4′-Dimethyl-1,1′-tetramethylene-2,2′-bipyridinium *16.370*
4,5,4′,5′-Tetramethyl-1,1′-ethylene-2,2′-bipyridinium *16.564, 26.352*

$C_{16}H_{20}N_2O_6S_2$
1,1′-Bis(3-sulfonatopropyl)-4,4′-bipyridinium *16.312*

$C_{16}H_{29}Co_2N_8O_4^{3+}$
μ-(Pyrazinecarboxylato)bis[hydroxo(1,4,7-triazacyclononane)cobalt(III)] ion *16.95*

$C_{16}H_{32}Cl_2CoN_4^{+}$
Dichloro(5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-diene)cobalt(III) ion *16.89, 26.54*

$C_{16}H_{32}CoN_4^{+}$
N-rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(I) ion *17.9*

$C_{16}H_{32}CoN_4^{2+}$
N-rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion *1.6, 12.9, 13.8, 16.14, 17.13, 20.3, 26.13, 27.249.1, 27.26.1*
N-meso-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(II) ion *1.7, 17.12, 26.12, 3.2, 7.1*
5,7,7,12,12,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,14-dienecobalt(II) ion *16.16, 26.14*

$C_{16}H_{32}CoN_4^{3+}$
N-rac-5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(III) ion *26.53*

$C_{16}H_{32}CuN_4^{2+}$
5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecopper(II) ion *12.39, 13.30, 16.154, 26.73*

$C_{16}H_{32}N_4Ni^{2+}$
5,7,7,12,14,14-Hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienenickel(II) ion *26.133*

$C_{16}H_{33}CoN_4^{2+}$
Hydrido-*N-rac*-5,7,7,12,14,14-hexamethyl-1,4,8,11-tetraazacyclotetradeca-4,11-dienecobalt(III) ion *17.10, 26.9*

$C_{19}H_{30}Co_2N_7O_4^{3+}$
μ-*p*-Nitrobenzoatobis[hydroxo(1,4,7-triazacyclononane)cobalt(III)] ion *16.94*

$C_{20}H_2Cl_4I_4O_5^{2-}$
Rose Bengal dianion *26.348*

$C_{20}H_6Br_4O_5^{2-}$
Eosin dianion *13.101, 26.243*

$C_{20}H_{10}O_5^{2-}$ Fluorescein dianion *13.102, 26.252*

$C_{20}H_{12}$ Perylene *26.330*

$C_{20}H_{13}N_2O_5S^-$
1-Amino-4-anilino-9,10-anthraquinone-2-sulfonate ion *27.143.1*

$C_{20}H_{16}CoN_4^{2+}$
Bis(2,2′-bipyridine)cobalt(II) ion *16.19, 26.16*

$C_{20}H_{19}N_4^+$ Safranine cation *16.557, 25.20, 27.162.1*

$C_{20}H_{20}N_4Rh^{2+}$
Bis(2,2′-bipyridine)rhodium(II) ion *16.220*

$C_{20}H_{22}N_4O_2Rh^+$
Bis(2,2′-bipyridine)dihydroxyrhodium(III) ion *16.221*

$C_{20}H_{22}N_7O_6^+$
5,10-Methenyltetrahydrofolate *16.431, 26.280*

$C_{20}H_{26}CoN_5O_4$
Benzylbis(dimethylglyoximato)(pyridine)-cobaltate(III) *12.27, 16.104*

$C_{20}H_{30}O_2^-$ Radicals from arachidonate *27.212*

$C_{20}H_{32}N_6O_{12}S_2$
Glutathione, oxidized *16.397, 26.258, 27.140.6*

$C_{20}H_{32}N_6O_{12}S_2.Cu$
Glutathionecopper(II), oxidized *26.82*

$C_{20}H_{35}O_5$ Dicyclohexano-18-crown-6 radical *27.79*

$C_{20}H_{40}CuN_4^{2+}$
2,2,4,11,11,13-Hexamethyl-1,5,10,14-tetraazacyclooctadeca-4,13-dienecopper(II) ion *26.74*

$C_{20}H_{40}N_4Ni^{2+}$
1,4,5,7,7,8,11,12,14,14-Decamethyl-1,4,8,11-tetraazacyclotetradecane-nickel(II) ion *26.134*

$C_{21}H_{17}N_3O_3S$
N^1-(Acridinyl)-N^4-methylsulfonyl-2-methoxycyclohexa-2,5-diene-1′,4′-diimine *16.275*

$C_{21}H_{20}N_3O_3S^+$
9-(2-Methoxy-4-methylsulfonyl-aminoanilino)acridinium *16.433*

$C_{21}H_{26}NO_2S$
2-[3-(*N*,*N*,*N*-Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene radical anion *30.38*

$C_{21}H_{26}NO_2S^+$
2-[3-(*N*,*N*,*N*-Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene *16.581*

$C_{21}H_{26}N_7O_{13}P_2^+$
Nicotinamide adenine dinucleotide *12.168, 16.468, 25.17, 26.301, 27.28.8*

$C_{21}H_{27}NO_2S^+$
2-[3-(*N*,*N*-*N*-Trimethylammonio)-2-hydroxypropyl]-3,4-dimethyl-9-oxothioxanthene radical anion, protonated *30.38*

$C_{212}H_{306}FeN_4O_{154}S_4^{5-}$
Dihydroxytetrakis(4-sulfonatophenyl)porphinatoferrate(III)-β-cyclodextrin complex *12.49*

$C_{21}H_{56}CoN_{14}O_5Os^{5+}$
Pentaammineosmium(III)(isonicotinylprolylprolinato)pentaamminecobalt(III) ion *16.119, 26.66*

$C_{22}H_{18}N_2^{2+}$ 1,1′-Diphenyl-4,4′-bipyridinium *26.240*

$C_{22}H_{20}N_4O_2S$
N^1-(Acridinyl)-N^4-methylsulfonyl-2-dimethylaminocyclohexa-2,5-diene-1′,4′-diimine *16.274*

$C_{22}H_{24}N_2O_8$ Tetracycline *16.558, 26.349*

$C_{22}H_{46}N_{16}Ru_3^{6+}$
Decaamminebis(2,2′-bipyridine)bis[μ-(cyano)]triruthenium(III),(II),(III) ion *17.43, 26.156*

$C_{23}H_{25}N_2^+$ Malachite Green cation *30.4.11*

$C_{24}H_{16}CuN_4^+$
Bis(1,10-phenanthroline)copper(I) ion *17.21*

$C_{24}H_{16}CuN_4^{2+}$
Bis(1,10-phenanthroline)copper(II) ion *27.92.2*

$C_{24}H_{16}N_4^{2+}$ 1,1′-Bis(4-cyanophenyl)-4,4′-bipyridinium *26.194*

$C_{32}H_{34}N_4O_4$ Deuteroporphyrin, dimethyl ester *1.58, 16.341*

$C_{32}H_{50}N_{16}Ru_3^{6+}$
Octaamminebis(2,2′-bipyridine)bis[μ-(cyano))]bis(pyridine)triruthenium(III),(II),(III) ion *26.158*

$C_{33}H_{34}N_4O_6^{2-}$
Bilirubin dianion *26.190*

$C_{34}H_{24}N_6O_{14}S_4^{4-}$
Trypan Blue tetraanion *16.586*

$C_{34}H_{32}ClFeN_4O_4$
Iron(III) protoporphyrin *13.34*

$C_{34}H_{32}FeN_4O_4$
Iron(II) protoporphyrin *12.42, 13.32, 14.6, 16.159, 26.87, 27.158.3*

$C_{34}H_{36}CrN_4O_4$
Chromium(III) mesoporphyrin *16.149, 17.18*

$C_{34}H_{36}N_4O_6Zn$
Zinc(II) hematoporphyrin *16.269*

$C_{34}H_{38}N_4O_6$ Hematoporphyrin IX *12.142, 13.107, 16.400, 26.260*

$C_{36}H_{21}Br_3CrN_6^{3+}$
Tris(5-bromo-1,10-phenanthroline)-chromium(III) ion *16.138*

$C_{36}H_{21}Cl_3CrN_6^{3+}$
Tris(5-chloro-1,10-phenanthroline)-chromium(III) ion *16.139*

$C_{36}H_{24}CoN_6^{3+}$
Tris(1,10-phenanthroline)cobalt(III) ion *12.29, 13.21, 16.113*

$C_{36}H_{24}CrN_6^{3+}$
Tris(1,10-phenanthroline)chromium(III) ion *16.137*

$C_{36}H_{24}FeN_6^{3+}$
Tris(1,10-phenanthroline)iron(III) ion *1.25, 11.2.2, 12.47, 13.38, 14.7, 15.1, 16.164, 17.27, 2.24, 21.5, 22.11, 27.45.3, 27.47.6, 7.5*

$C_{36}H_{24}N_6Rh^{3+}$
Tris(1,10-phenanthroline)rhodium(III) ion *12.76, 13.56, 16.223*

$C_{36}H_{24}N_6Ru^{2+}$
Tris(1,10-phenanthroline)ruthenium(II) ion *12.79, 13.58, 16.233*

$C_{36}H_{32}N_4^{4+}$ 1,1′-*o*-Xylylenebis(4,4′-bipyridinium) *16.592*

$C_{36}H_{36}CoN_6^{2+}$
Tris(4,4′-dimethyl-2,2′-bipyridine)cobalt(II) ion *16.22, 26.20*

$C_{36}H_{36}CrN_6^{3+}$
Tris(4,4′-dimethyl-2,2′-bipyridine)chromium(III) ion *16.136*

$C_{38}H_{30}N_8Ru^{2+}$
Bis(2,2′-bipyridine)(dipyrido[3,2-*a*:2′,3′-*c*]phenazine)ruthenium(II) ion *26.151*

$C_{39}H_{30}CrN_6^{3+}$
Tris(5-methyl-1,10-phenanthroline)-chromium(III) ion *16.140*

$C_{39}H_{58}O_4$ Ubiquinone 30 *16.587*

$C_{40}H_{24}MnN_8^{+}$
5,10,15,20-Tetrakis(4-pyridyl)-porphinatomanganese(III) ion *16.189*

$C_{40}H_{24}N_8Sb^{3+}$
5,10,15,20-Tetrakis(4-pyridyl-)porphinatoantimony(V) ion *16.241*

$C_{40}H_{30}MnN_8O_2^{-}$
Bis(hydroxy)tetrakis(4-pyridyl)-porphinatomanganate(III) ion *21.8*

$C_{40}H_{30}N_{10}O_6^{2+}$
Nitro Blue Tetrazolium *26.304*

$C_{40}H_{46}ClFeN_6O_8S_2$
Hemin c *16.170, 24.3, 26.109, 27.65.1, 27.89.1, 27.92.4, 30.3.4*

$C_{42}H_{36}CoN_6^{3+}$
Tris(5,6-dimethyl-1,10-phenanthroline)-cobalt(III) ion *12.30, 13.22, 16.114*

$C_{42}H_{36}CrN_6^{3+}$
Tris(5,6-dimethyl-1,10-phenanthroline)-chromium(III) ion *16.141*

$C_{44}H_{24}AgN_4O_{12}S_4^{4-}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatoargentate(II) ion *16.5*

$C_{44}H_{24}CoN_4O_2S_4^{4-}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatocobaltate(II) ion *1.13, 12.12, 16.23, 4.1*

$C_{44}H_{24}CrN_4O_{12}S_4^{3-}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatochromate(III) ion *16.148*

$C_{44}H_{24}CuN_4O_{12}S_4^{4-}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatocuprate(II) ion *16.155*

$C_{44}H_{24}FeN_4O_{12}S_4^{3-}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatoferrate(III) ion *12.48, 16.166, 26.103*

$C_{44}H_{24}MnN_4O_{12}S_4^{3-}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatomanganate(III) ion *16.195, 26.122, 9.3*

$C_{44}H_{24}MnN_4O_{12}S_4^{4-}$
5,10,15,20-Tetrakis(4-sulfonatophenyl)-porphinatomanganate(II) ion *1.31, 16.188, 17.30, 27.76.1*

11. Chemical Name Index