Wavelengths and Energy Level Classifications for the Spectra of Aluminum (Al I through Al XIII)

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Wavelengths and their classifications have been compiled for the spectra of the atom and all positive ions of aluminum ($Z=13$). The selections of data are based on the compilations of energy levels by Martin and Zalubas [1979, J. Phys. Chem. Ref. Data **8**, 817–864], with some updating from the more recent literature. Wavelengths (or wavenumbers) calculated from the differences of the energy levels are given along with the observed values for all classified lines; these calculated wavelengths should in general be more accurate than the observed values wherever the two values differ significantly. Calculated wavelengths are also given for a number of lines that have not yet been observed, including some important forbidden transitions. The most complete data are given in separate tables for the different spectra. No limitation has been imposed on the wavelength range of the classified lines, except for the omission of x-ray transitions in the neutral atom. Two finding lists are also included, one for Al I through Al III and the other for Al IV through Al XIII.

Key words: aluminum; atomic energy levels; atomic ions; atomic spectra; atomic wavelengths; atomic wavenumbers.

Contents

1. Introduction

The Atomic Energy Levels Data Center of the National Institute of Standards and Technology (NIST) publishes critical compilations of atomic energy levels, which have updated and extended the three volumes of *Atomic Energy Levels* by Charlotte Moore [1971]. Martin, Zalubas, and Hagan [1978] compiled energy-level data for spectra of the rare-earth elements lanthanum to lutetium ($Z=57-71$). New critical compilations of energy-level data have also been published for Na I–XI, Mg I–XII, Al I–XIII, Si I–XIV [Martin and Zalubas, 1981, 1980, 1979, 1983, respectively], P I–XV, and S I–XVI [Martin, Zalubas, and Musgrove, 1985, 1990]. Compilations of the energy levels for all spectra of the iron-peric elements potassium through nickel [Sugar and Corlis 1985] and for Mo I–XLII and Cu I–XXIX [Sugar ar Musgrove, 1988, 1990] have also appeared.

These new compilations review the literature ar provide a basis for assembling a complete list of classifi spectral lines for each stage of ionization. Recently NIS in collaboration with the Japan Atomic Energy Resear Institute, has compiled wavelengths for high-ionizati spectra of iron, nickel, copper, and molybdenum [Shi *et al.*, 1990, 1987a, 1991, 1987b]. Wavelength compi tions for *all* stages of ionization have been published f scandium [Kaufman and Sugar, 1988] and magnesi [Kaufman and Martin, 1991].

We have used the aluminum energy-levels compi tions by Martin and Zalubas [1979], supplemented some more recent publications, to compile the lists classified lines given here. The energy levels were used predict wavenumbers and wavelengths for comparis with the directly measured values.

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Wavelengths (or wavenumbers) calculated from the fferences of the energy levels are given along with the served values for all classified lines. *Unless otherwise ted, the calculated wavelengths should in general be more curate than the observed values wherever the two values fer significantly*. The upper energy levels for some tranions were rounded off to fewer significant figures than ere given for the observed wavelengths, in order to repsent the uncertainties of the data more realistically; any fferences between such observed wavelengths and vals calculated from the rounded-off energy levels are in neral insignificant. In a few cases, needed reevaluaons of particular energy levels on the basis of more rent measurements have not yet been carried out; and in me cases we tabulate two or more experimentally relved hyperfine-structure components belonging to a ngle calculated transition. The greater accuracy or resotion of the pertinent observed wavelengths is menoned in such cases.

The most complete data are given in thirteen separate bles, one for each spectrum (ionization stage). No limation has been imposed on the wavelength range of the assified lines, except for the omission of x-ray transions in the neutral atom. In addition to electric-dipole ansitions, we have tabulated "forbidden" lines from agnetic-dipole or electric-quadrupole transitions.

Some observed lines are classified as unresolved blends f two or more transitions. We list the calculated wavength for each of the main components of such a blend r, in some cases, the calculated wavelength of the proble strongest component.

Calculated wavelengths are given for a substantial umber of lines that have not yet been observed, includg both allowed and important forbidden transitions. he calculated wavelengths for (helium-like) Al XII and ydrogen-like) Al XIII were derived from theoretically alculated levels, since their estimated accuracy is greater an the accuracy of levels based on the available meairements. We have significantly extended the wavength tables for both of these spectra by including alculated wavelengths for a relatively large number of as et unobserved lines.

At the beginning of the table for each spectrum, e give the isoelectronic sequence, the ground tate, and the ionization energy (the divisor 065.5410 ± 0.0024 cm^{-1}/eV has been used to convert avenumber values to eV units [Cohen and Taylor, 987]). A list of references is also given with each table. *)ur comments on the data and references are supplementary) the information given by Martin and Zalubas [1979]; this eference is hereafter abbreviated as "MZ79" and is omitted om the reference lists for the individual tables.*

The format of the tables is similar to that adopted by Kelly [1987]. The comments below follow the sequence of he columns in the tables.

Mult. No.

The multiplet numbers are those assigned by Moore [1950, 1959].

Relative Intensity

The numbers are usually visual estimates related in some way to plate blackening. Some authors limit these estimated to a small range (e.g., 1 to 10) while others reach into the 100,000's. Such numbers are useful within a small wavelength range and are meaningful only for comparing lines of a particular spectrum as taken from a particular reference. More meaningful relative intensities obtained with photoelectric or solid-state detectors are given by some authors, especially for observations in the infrared region. We have in some cases adjusted the intensities in particular regions to reduce apparent discrepancies between different observers, etc. Kelly [1987] adjusted the various intensity scales of the original observers to a normalized scale having a maximum intensity of 1000. For some spectra, we give Kelly's adjusted intensities for some or all of the lines below 2000 Å. We use the following symbols to further characterize the lines:

- M1, M2, E2,... magnetic-dipole, magnetic-quadrupole, electric-quadrupole,... transition
- *bl* blended with another line that may affect the wavelength and intensity
- *m* masked by another line (no wavelength measurement)
- *d* diffuse, wide, hazy, etc.
- *g* transition involving a level of the ground term
- *a* observed in absorption

Wavelength

Vacuum wavelengths are given for the region below 2000 Å and wavelengths in standard air for the region 2000 – 10 000 Å. The data are tabulated in order of increasing wavelengths. Both the observed and calculated wavelengths are given for the classified lines, the calculated values being obtained from the energy-levels differences. A question mark following a calculated wavelength indicates that the energy-levels classification of the line is questionable. We converted vacuum wavelengths or wavenumbers to wavelengths in air using the three-term formula of Peck and Reeder [1972] for the index of refraction of air.

Wavenumber

Vacuum wavenumbers are given instead of wavelengths for lines having wavelengths greater than 10 000 Å (1000 nm). The lines are listed in order of decreasing wavenumber, and both the observed and calculated values are given for classified lines.

Levels

The numerical values of the two levels for the transition. The values of levels obtained from theoretical calculations are enclosed in brackets. A question mark following the upper level indicates that the classification is tentative.

Configurations, Terms, and *J* Values

These data for the two levels are given in successive columns. The configuration and term notations are described fully by Martin *et al*. [1978]. Levels having incomplete theoretical designations are indicated by blank spaces in one or more of the columns. A blank *J* value may also indicate that the corresponding level value represents two or more unresolved levels. A fully interpreted level lacking an appropriate configuration and/or term designation because of a strongly mixed eigenvector composition is indicated by the symbol " $\langle\psi|$ " in the corresponding column(s).

Ref.

The letter-numerical symbols indicate references listed at the beginning of the table. The references in this column are for the *observed* wavelength values only. If two or more references are listed for a single observed wavelength, the value is usually a weighted average.

The tables for the individual spectra are followed by two finding lists. Section 3 contains the lines of Al I through Al III and Section 4 contains the lines of Al IV through Al XIII. This separation is intended to follow roughly the division of user interests. The two finding lists include only wavelengths, intensities, and spectrum symbol. The wavelengths in the finding lists are observed values unless otherwise indicated: wavelengths calculated from experimental energy levels are followed by the letter "*c*", and calculated wavelengths involving theoretical or series-formula levels are given in brackets.

1.1. References for the Introduction

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2. Tables of Wavelengths and Energy Level Classifications

Al I

Ground state $1s^22s^22p^63s^23p\ ^2P^o_{1/2}$

Ionization energy 48 278.480 ± 0.025 cm^{-1} (5.985 771 ± 0.000 003 eV)

As noted in MZ79, components of the $3s3p^2\ ^2D$ term contribute to the eigenvectors of the $3s^2nd\ ^2D$ series members so that most of the $3s3p^2\ ^2D$ composition is distributed amongst the first few members of the series. This absorption of the $3s3p^2\ ^2D$ term by the $3s^2nd$ series leads to a mislabeling of the higher $3s^2nd$ members if the lower ^2D terms are assigned $3s^2nd$ names in the unbroken sequence $n = 3,4,5,\ldots$. We have here avoided this mislabeling by designating the former $3s^24d\ ^2D$ term as "$y\ ^2D$" and reducing by unity the n values of all the previous $3s^2nd\ ^2D$ terms having $n \geq 5$. *This change must be taken into account in comparing the classifications of transitions involving the* $3s^2nd\ ^2D$ *levels given here with those in the previous literature and also with the levels tabulated in* MZ79.

Ericksson and Isberg [E1] gave their measurements of the $3s^23p - 3s^24s$ and $3s^23p - 3s^23d$ resonance wavelengths to four decimal places, although the observed lines are complicated by hyperfine spreads of ~0.03 to ~0.05 cm^{-1} for the levels involved. We have listed four-place calculated wavelengths for the lower $3p - nd$ and $3p - ns$ series members (2169 – 3962 Å), in part to indicate their higher accuracy relative to other lines in this region. Paschen's [P4] measurements of weakly recorded lines have apparent errors up to ±0.06 Å.

The observations of the higher $3p - ns$ and $3p - nd$ series members are described in MZ79. We have recalculated the $10s$ through $16s$ levels using a new series formula (see below). The energy levels for some of the higher $nd\ ^2D$ terms in MZ79 were derived entirely from Yamashita's measurements [Y1] because of an apparent systematic error in the results of [P3]; we nevertheless give averaged values for the "observed" wavelengths in the region where the two sets of observations overlap.

The infrared observations by Biémont and Brault [B1] cover the range 8884 – 1866 cm^{-1}, the apparent wavenumber uncertainty being a few units in the third decimal place for most of the lines. Biémont and Brault located the $3s^25g, 6g, 7g$, and $7h$ doublet terms, and Chang [1990] used the new infrared data of [B1] to reevaluate the levels in the range from $3s^23d$ through $3s^27h$. The corresponding level values adopted here are mostly from Chang's results, the main exceptions being that we have included measurements from [E1] in evaluating the $3s^23d$ and $3s^26f$ levels. We have omitted the hyperfine structures included in Chang's evaluations of the $3s^2ns$, np, and nd levels; for some transitions we thus list the experimental wavenumbers for two or more resolved hyperfine components [B1] along with a single calculated wavenumber.

We have also reevaluated the $3s3p(^3P^o)nd\ ^2D^o$; levels using the new $3s^2nd\ ^2D$ level values. The re $3s3p(^3P^o)3d\ ^2D^o$ levels have Ritz-principle consis justifying three decimal-place values. We also give place values for the $3s3p^2\ ^2P$ levels, based on the ir transitions $3s3p^2\ ^2P - 3s3p(^3P^o)3d\ ^2D^o$ [E1]. Th four-place Ritz-principle calculated wavelengths for the $3s^23p\ ^2P^o - 3s3p^2\ ^2P$ lines (1763 – 1769 , probably accurate within ±0.001 Å.

The $3s^2ng$ and $7h$ terms are connected to the $3s$ ground term through accurate measurements of v infrared transitions [B1, B4; see Chang, 1990] ar $3s^23p - 3s^24s$ resonance doublet [E1]. We obtain ionization energy given above by fitting the $3s^25g$, and $7h$ terms to a core-polarization formula wit dipole polarizability, the quadrupole polarizability the ionization energy as variable parameters. This for the ionization energy agrees exactly with the Chang obtained by an essentially similar procedure estimated uncertainty is mainly due to the overall u tainty of the connection of the $3s^2ng$ and $7h$ levels the ground term.

We give the calculated wavenumber of the $6h - 7$ (810.706 cm^{-1}), and also the energies for both of levels, as obtained from the polarization formula; ne level is connected experimentally to the other know els.

We have fitted the $3s^2ns$ ($n = 4 - 9$) and ($n = 3 - 7$) levels to new Ritz-type series formulae those used in [E1], but with the limit fixed at the n adopted value. Although this adopted limit is 0.11 higher than the value derived in E1 from a fit of th series ($n = 4 - 6$), we find no unacceptable deviatior any of the ns or np levels from our formulae.

Zherikhin *et al.* [Z1] used a laser step-excita method to observe $3d - nf$ transitions for $n = 11$ tc (6234 – 6697 Å). We combined their experime wavenumbers for the $3d\ ^2D_{3/2} - nf\ ^2F^o_{5/2}$ and $^2D_{5/2} - nf\ ^2F^o$ transitions with the adopted $3d\ ^2D$ level ues to obtain an average position for each $nf\ ^2F^o$ term. then fitted a three-constant Ritz formula to the entir series ($n = 4 - 8$, $11 - 55$) with appropriate rela weights for the different members and allowed the li to vary. This procedure yielded a limit of 48 278.45 cm in reasonable agreement with the value adopted abo The limit we obtain from the nf series is 0.03 cm^{-1} ab the value derived by Zherikhin *et al.* [Z1], partly beca our $nf\ ^2F^o$ levels are systematically higher than the val of [Z1] (due to higher $3d\ ^2D$ levels) and partly because include the lower series members with high relat weights. The $9f$ and $10f$ $^2F^\circ$ levels adopted here were calculated with the new series formula.

The two-place observed wavelengths given for the $3d-nf$ lines ($n=11-55$) were obtained from the corresponding experimental wavenumbers [Z1]. The three-place wavelengths calculated from the levels should on the average be somewhat more accurate. The estimated wavenumber error of $\pm 0.05\ \mathrm{cm}^{-1}$ [Z1] corresponds to ± 0.02 Å; somewhat larger discrepancies for some of the $3d-nf$ measurements are indicated by the nf series behavior.

Cantù *et al.* [C1] have observed the absorption spectrum in the region near 150 Å and classified 8 of 33 measured lines as arising from L-shell excitation. We give their classifications for four lines; the corresponding upper levels were evaluated by assuming each line to be an unresolved doublet comprising the transitions from both $^2P^\circ_{1/2,3/2}$ ground-term levels. We have omitted multiple classifications for four other lines because the upper levels involved are not experimentally resolved.

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Al I

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm⁻¹) Lower	Upper	Configurations	Terms	J Values	Ref.
	3*a*	145.88							C1
	3*a*	146.26							C1
	2*a*	150.40							C1
	3*a*	150.94							C1
	5*a*	151.84							C1
	3*a*	152.32							C1
	6*a*	152.72							C1
	3*a*	152.85							C1
	2*a*	153.06							C1
	2*a*	153.25	153.23	0.000	652 600	$2p^63s^23p - 2p^53s^23p(^1S)4s$	$^2P^\circ - ^2S$	1/2 – 1/2	C1
			153.26	112.061	652 600	$2p^63s^23p - 2p^53s^23p(^1S)4s$	$^2P^\circ - ^2S$	3/2 – 1/2	
	2*a*	153.62							C1
	4*a*	153.88							C1
	1*a*	154.26							C1
	1*a*	154.45							C1
	5*a*	154.84							C1
	2*a*	154.99							C1
	2*a*	155.10							C1
	20*a*	155.45							C1
	10*a*	155.83							C1
	9*a*	156.05							C1
	7*a*	156.25							C1
	2*a*	156.65	156.64	0.000	638 400	$2p^63s^23p - 2p^53s^23p(^3D)4s$	$^2P^\circ - ^4D$	1/2 – 3/2	C1
			156.67	112.061	638 400	$2p^63s^23p - 2p^53s^23p(^3D)4s$	$^2P^\circ - ^4D$	3/2 – 3/2	
	2*a*	156.72	156.72	112.061	638 080	$2p^63s^23p - 2p^53s^23p(^3D)4s$	$^2P^\circ - ^4D$	3/2 – 5/2	C1
	2*a*	156.87							C1
	1*a*	157.03							C1
	3*a*	157.13							C1
	9*a*	157.27	157.25	0.000	635 920	$2p^63s^23p - 2p^53s^23p(^3S)4s$	$^2P^\circ - ^2S$	1/2 – 1/2	C1
			157.28	112.061	635 920	$2p^63s^23p - 2p^53s^23p(^3S)4s$	$^2P^\circ - ^2S$	3/2 – 1/2	
	2*a*	157.44							C1

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	1*a*	157.64							C1
	2*a*	157.86							C1
	2*a*	157.98							C1
	2*a*	158.08							C1
	6*a*	159.25							C1
	36*g,a*	1181.907	1181.907	112.061 –	84 721.1	$3s^2(^1S)3p - 3s3p(^3P^\circ)11p$?	$^2P^\circ - ^2S$?	$3/2 - 1/2$?	R1
	26*g,a*	1182.01	1182.01	112.061 –	84 714	$3s^2(^1S)3p - 3s3p(^3P^\circ)11p$?	$^2P^\circ - ^2D$?	$3/2 - 5/2$?	R1
	57*g,a*	1182.379	1182.378	0.000 –	84 575.3	$3s^2(^1S)3p - 3s3p(^3P^\circ)11p$?	$^2P^\circ -$	$1/2 - 3/2$?	R1
	81*g,a*	1185.660	1185.660	112.061 –	84 453.3	$3s^2(^1S)3p - 3s3p(^3P^\circ)10p$?	$^2P^\circ - ^2S$?	$3/2 - 1/2$?	R1
	57*g,a*	1185.79	1185.79	112.061 –	84 444	$3s^2(^1S)3p - 3s3p(^3P^\circ)10p$?	$^2P^\circ - ^2D$?	$3/2 - 5/2$?	R1
	60*g,a*	1186.346	1186.347	0.000 –	84 292.4	$3s^2(^1S)3p - 3s3p(^3P^\circ)10p$?	$^2P^\circ -$	$1/2 - 3/2$?	R1
	94*g,a*	1190.939	1190.939	112.061 –	84 079.4	$3s^2(^1S)3p - 3s3p(^3P^\circ)9p$?	$^2P^\circ - ^2S$?	$3/2 - 3/2$?	R1
	75*g,a*	1191.34	1191.34	112.061 –	84 051	$3s^2(^1S)3p - 3s3p(^3P^\circ)9p$?	$^2P^\circ - ^2D$?	$3/2 - 5/2$?	R1
	130*g,a*	1192.211	1192.212	0.000 –	83 877.7	$3s^2(^1S)3p - 3s3p(^1P^\circ)4p$?	$^2P^\circ - ^2P$?	$1/2 - 3/2$?	R1
	140*g,a*	1192.320	1192.321	0.000 –	83 870.0	$3s^2(^1S)3p - 3s3p(^3P^\circ)9p$?	$^2P^\circ -$	$1/2 - 3/2$?	R1
	86*g,a*	1193.807	1193.807	112.061 –	83 877.7	$3s^2(^1S)3p - 3s3p(^1P^\circ)4p$?	$^2P^\circ - ^2P$?	$3/2 - 3/2$?	R1
	62*g,a*	1194.955	1194.955	112.061 –	83 797.2	$3s^2(^1S)3p - 3s3p(^1P^\circ)4p$?	$^2P^\circ - ^2P$?	$3/2 - 1/2$?	R1
	36*g,a*	1197.73	1197.73	0.000 –	83 491	$3s^2(^1S)3p - 3s3p(^1P^\circ)4p$?	$^2P^\circ - ^2D$?	$1/2 - 3/2$	R1
	65*g,a*	1198.482	1198.48	0.000 –	83 439	$3s^2(^1S)3p - 3s3p(^3P^\circ)8p$?	$^2P^\circ - ^2D$?	$1/2 - 3/2$?	R1
	125*g,a*	1198.686	1198.687	112.061 –	83 536.7	$3s^2(^1S)3p - 3s3p(^3P^\circ)8p$?	$^2P^\circ - ^2S$?	$3/2 - 1/2$?	R1
	86*g,a*	1199.34	1199.34	112.061 –	83 491	$3s^2(^1S)3p - 3s3p(^1P^\circ)4p$?	$^2P^\circ - ^2D$?	$3/2 - 5/2$	R1
	120*g,a*	1199.959	1199.96	112.061 –	83 448	$3s^2(^1S)3p - 3s3p(^3P^\circ)8p$?	$^2P^\circ - ^2D$?	$3/2 - 5/2$?	R1
	91*g,a*	1200.095	1200.09	112.061 –	83 439	$3s^2(^1S)3p - 3s3p(^3P^\circ)8p$?	$^2P^\circ - ^2D$?	$3/2 - 3/2$?	R1
	96*g,a*	1200.459	1200.454	0.000 –	83 301.8	$3s^2(^1S)3p - 3s3p(^3P^\circ)8p$?	$^2P^\circ -$	$1/2 - 3/2$?	R1
	150*g,a*	1200.853	1200.849	0.000 –	83 274.4	$3s^2(^1S)3p - 3s3p(^3P^\circ)8p$?	$^2P^\circ -$	$1/2 - 3/2$?	R1
	34*g,a*	1202.066	1202.071	112.061 –	83 301.8	$3s^2(^1S)3p - 3s3p(^3P^\circ)8p$?	$^2P^\circ -$	$3/2 - 3/2$?	R1
	160*g,a*	1202.463	1202.467	112.061 –	83 274.4	$3s^2(^1S)3p - 3s3p(^3P^\circ)8p$?	$^2P^\circ -$	$3/2 - 3/2$?	R1
	55*g,a*	1209.165	1209.164	0.000 –	82 701.8	$3s^2(^1S)3p - 3s3p(^3P^\circ)7p$	$^2P^\circ - ^2S$	$1/2 - 1/2$	R1
	110*g,a*	1210.803	1210.804	112.061 –	82 701.8	$3s^2(^1S)3p - 3s3p(^3P^\circ)7p$	$^2P^\circ - ^2S$	$3/2 - 1/2$	R1
	105*g,a*	1212.33	1212.33	112.061 –	82 598	$3s^2(^1S)3p - 3s3p(^3P^\circ)7p$	$^2P^\circ - ^2D$	$3/2 - 5/2$	R1
	165*g,a*	1213.425	1213.429	0.000 –	82 411.1	$3s^2(^1S)3p - 3s3p(^3P^\circ)7p$	$^2P^\circ -$	$1/2 - 3/2$	R1
	78*g,a*	1213.954	1213.955	0.000 –	82 375.4	$3s^2(^1S)3p - 3s3p(^3P^\circ)7p$	$^2P^\circ -$	$1/2 - 1/2$?	R1
	265*g,a*	1214.553	1214.555	0.000 –	82 334.7	$3s^2(^1S)3p - 3s3p(^3P^\circ)7p$	$^2P^\circ -$	$1/2 - 3/2$?	R1
	96*g,a*	1215.084	1215.081	112.061 –	82 411.1	$3s^2(^1S)3p - 3s3p(^3P^\circ)7p$	$^2P^\circ -$	$3/2 - 3/2$?	R1
	260*g,a*	1216.212	1216.210	112.061 –	82 334.7	$3s^2(^1S)3p - 3s3p(^3P^\circ)7p$	$^2P^\circ -$	$3/2 - 3/2$?	R1
	160*g,a*	1229.783	1229.785	0.000 –	81 315.0	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ - ^2S$	$1/2 - 3/2$	R1
	455*g,a*	1231.484	1231.483	112.061 –	81 315.0	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ - ^2S$	$3/2 - 3/2$	R1
	1000*g,a*	1234.85	1234.84	112.061 –	81 094	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ - ^2D$	$3/2 - 5/2$	R1
	50*g,a*	1235.587	1235.585	0.000 –	80 933.3	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ -$	$1/2 - 3/2$?	R1
	100*g,a*	1237.298	1237.299	112.061 –	80 933.3	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ -$	$3/2 - 3/2$?	R1
	590*g,a*	1237.442	1237.443	0.000 –	80 811.8	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ -$	$1/2 - 3/2$?	R1
	230*g,a*	1237.986	1237.985	0.000 –	80 776.4	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ -$	$1/2 - 1/2$?	R1
	550*g,a*	1238.628	1238.629	0.000 –	80 734.4	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ -$	$1/2 - 3/2$?	R1
	260*g,a*	1238.810	1238.809	0.000 –	80 722.7	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ -$	$1/2 - 1/2$?	R1
	775*g,a*	1239.162	1239.161	112.061 –	80 811.8	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ -$	$3/2 - 3/2$?	R1
	1035*g,a*	1240.352	1240.351	112.061 –	80 734.4	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ -$	$3/2 - 3/2$?	R1
	425*g,a*	1240.531	1240.531	112.061 –	80 722.7	$3s^2(^1S)3p - 3s3p(^3P^\circ)6p$	$^2P^\circ -$	$3/2 - 1/2$?	R1
	285*g,a*	1269.956	1269.956	0.000 –	78 742.9	$3s^2(^1S)3p - 3s3p(^3P^\circ)5p$	$^2P^\circ - ^2S$	$1/2 - 1/2$	R1
	620*g,a*	1271.765	1271.766	112.061 –	78 742.9	$3s^2(^1S)3p - 3s3p(^3P^\circ)5p$	$^2P^\circ - ^2S$	$3/2 - 1/2$	R1
	1780*g,a*	1279.45	1279.44	112.061 –	78 271	$3s^2(^1S)3p - 3s3p(^3P^\circ)5p$	$^2P^\circ - ^2D$	$3/2 - 5/2$	R1
	75*g,a*	1284.454	1284.464	0.000 –	77 853.5	$3s^2(^1S)3p - 3s3p(^3P^\circ)5p$	$^2P^\circ -$	$1/2 - 3/2$?	R1
	155*g,a*	1286.325	1286.315	112.061 –	77 853.5	$3s^2(^1S)3p - 3s3p(^3P^\circ)5p$	$^2P^\circ -$	$3/2 - 3/2$?	R1
	1100*g,a*	1286.789	1286.791	0.000 –	77 712.7	$3s^2(^1S)3p - 3s3p(^3P^\circ)5p$	$^2P^\circ - ^2P$	$1/2 - 3/2$	R1
	395*g,a*	1287.532	1287.533	0.000 –	77 667.9	$3s^2(^1S)3p - 3s3p(^3P^\circ)5p$	$^2P^\circ -$	$1/2 - 1/2$?	R1
	730*g,a*	1287.946	1287.948	0.000 –	77 642.9	$3s^2(^1S)3p - 3s3p(^3P^\circ)5p$	$^2P^\circ -$	$1/2 - 3/2$?	R1

Al I — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	570*g,a*	1288.210	1288.212	0.000 –	77 627.0	$3s^2(^1S)3p - 3s3p(^3P^o)5p$	$^2P^o -$	$1/2 - 1/2$?	R1
	2090*g,a*	1288.650	1288.649	112.061 –	77 712.7	$3s^2(^1S)3p - 3s3p(^3P^o)5p$	$^2P^o - {}^2P$	$3/2 - 3/2$	R1
	335*g,a*	1289.393	1289.394	112.061 –	77 667.9	$3s^2(^1S)3p - 3s3p(^3P^o)5p$	$^2P^o -$	$3/2 - 1/2$?	R1
	1890*g,a*	1289.812	1289.809	112.061 –	77 642.9	$3s^2(^1S)3p - 3s3p(^3P^o)5p$	$^2P^o -$	$3/2 - 3/2$?	R1
	475*g,a*	1290.076	1290.074	112.061 –	77 627.0	$3s^2(^1S)3p - 3s3p(^3P^o)5p$	$^2P^o -$	$3/2 - 1/2$?	R1
	705*g,a*	1368.908	1368.907	0.000 –	73 051.0	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o - {}^2S$	$1/2 - 1/2$	R1
	1130*g,a*	1371.010	1371.010	112.061 –	73 051.0	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o - {}^2S$	$3/2 - 1/2$	R1
	2350*g,a*	1397.80	1397.80	112.061 –	71 653	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o - {}^2D$	$3/2 - 5/2$	R1
	4370*g,a*	1413.156	1413.158	0.000 –	70 763.5	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o - {}^2P$	$1/2 - 3/2$	R1
	1150*g,a*	1414.240	1414.239	0.000 –	70 709.4	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o - {}^2P$	$1/2 - 1/2$	R1
	1870*g,a*	1415.401	1415.399	112.061 –	70 763.5	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o - {}^2P$	$3/2 - 3/2$	R1
	1000*g,a*	1416.481	1416.484	112.061 –	70 709.4	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o - {}^2P$	$3/2 - 1/2$	R1
	630*g,a*	1417.222	1417.224	0.000 –	70 560.5	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o -$	$1/2 - 3/2$?	R1
	1040*g,a*	1419.479	1419.478	112.061 –	70 560.5	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o -$	$3/2 - 3/2$?	R1
	800*g,a*	1425.037	1425.036	112.061 –	70 285.7	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o -$	$3/2 - 3/2$?	R1
	380*g,a*	1431.018	1431.018	0.000 –	69 880.3	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o -$	$1/2 - 3/2$?	R1
	315*g,a*	1431.865	1431.859	0.000 –	69 839.3	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o -$	$1/2 - 1/2$	R1
	500*g,a*	1434.155	1434.160	112.061 –	69 839.3	$3s^2(^1S)3p - 3s3p(^3P^o)4p$	$^2P^o -$	$3/2 - 1/2$	R1
	100*g*	1762.899	1762.8918	0.000 –	56 724.980	$3s^2(^1S)3p - 3s3p^2$	$^2P^o - {}^2P$	$1/2 - 3/2$	E1
	200*g*	1765.636	1765.6323	0.000 –	56 636.933	$3s^2(^1S)3p - 3s3p^2$	$^2P^o - {}^2P$	$1/2 - 1/2$	E1
	200*g*	1766.385	1766.3813	112.061 –	56 724.980	$3s^2(^1S)3p - 3s3p^2$	$^2P^o - {}^2P$	$3/2 - 3/2$	E1
	200*g*	1769.140	1769.1327	112.061 –	56 636.933	$3s^2(^1S)3p - 3s3p^2$	$^2P^o - {}^2P$	$3/2 - 1/2$	E1
	1000*g,a*	1932.268	1932.266	0.000 –	51 752.7	$3s^2(^1S)3p - 3s3p^2$	$^2P^o - {}^2S$	$1/2 - 1/2$	R1
	1200*g,a*	1936.457	1936.459	112.061 –	51 752.7	$3s^2(^1S)3p - 3s3p^2$	$^2P^o - {}^2S$	$3/2 - 1/2$	R1
		Air Wavelength (Å)							
	g,a	2079.62	{ 2079.64	0.000 –	48 070	$3s^2(^1S)3p - 3s^2(^1S)23d$	$^2P^o - {}^2D$	$1/2 - 3/2$	P3
			{ 2079.64	112.061 –	48 182	$3s^2(^1S)3p - 3s^2(^1S)34d$	$^2P^o - {}^2D$	$3/2 - 5/2$	
	g,a	2079.87	2079.86	112.061 –	48 177	$3s^2(^1S)3p - 3s^2(^1S)33d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2080.15	2080.16	112.061 –	48 170	$3s^2(^1S)3p - 3s^2(^1S)32d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2080.46	{ 2080.46	0.000 –	48 051	$3s^2(^1S)3p - 3s^2(^1S)22d$	$^2P^o - {}^2D$	$1/2 - 3/2$	P3
			{ 2080.46	112.061 –	48 163	$3s^2(^1S)3p - 3s^2(^1S)31d$	$^2P^o - {}^2D$	$3/2 - 5/2$	
	g,a	2080.79	2080.81	112.061 –	48 155	$3s^2(^1S)3p - 3s^2(^1S)30d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2081.15	2081.16	112.061 –	48 147	$3s^2(^1S)3p - 3s^2(^1S)29d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2081.40	2081.32	0.000 –	48 031.1	$3s^2(^1S)3p - 3s^2(^1S)21d$	$^2P^o - {}^2D$	$1/2 - 3/2$	P3
	g,a	2081.57	2081.59	112.061 –	48 137	$3s^2(^1S)3p - 3s^2(^1S)28d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2082.01	2082.02	112.061 –	48 127	$3s^2(^1S)3p - 3s^2(^1S)27d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2082.50	2082.47	0.000 –	48 004.7	$3s^2(^1S)3p - 3s^2(^1S)20d$	$^2P^o - {}^2D$	$1/2 - 3/2$	P3,Y1
	g,a	2082.53	2082.54	112.061 –	48 115	$3s^2(^1S)3p - 3s^2(^1S)26d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2083.10	2083.11	112.061 –	48 102	$3s^2(^1S)3p - 3s^2(^1S)25d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2083.75	{ 2083.75	0.000 –	47 975.1	$3s^2(^1S)3p - 3s^2(^1S)19d$	$^2P^o - {}^2D$	$1/2 - 3/2$	P3,Y1
			{ 2083.76	112.061 –	48 087	$3s^2(^1S)3p - 3s^2(^1S)24d$	$^2P^o - {}^2D$	$3/2 - 5/2$	
	g,a	2084.48	2084.50	112.061 –	48 070	$3s^2(^1S)3p - 3s^2(^1S)23d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2085.24	2085.25	0.000 –	47 940.7	$3s^2(^1S)3p - 3s^2(^1S)18d$	$^2P^o - {}^2D$	$1/2 - 3/2$	P3,Y1
	g,a	2085.32	2085.32	112.061 –	48 051	$3s^2(^1S)3p - 3s^2(^1S)22d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3
	g,a	2086.23	2086.19	112.061 –	48 031.1	$3s^2(^1S)3p - 3s^2(^1S)21d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3,Y1
	g,a	2087.06	2087.01	0.000 –	47 900.1	$3s^2(^1S)3p - 3s^2(^1S)19d$	$^2P^o - {}^2D$	$1/2 - 3/2$	P3,Y1
	g,a	2087.36	2087.34	112.061 –	48 004.7	$3s^2(^1S)3p - 3s^2(^1S)20d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3,Y1
	g,a	2088.66	2088.63	112.061 –	47 975.1	$3s^2(^1S)3p - 3s^2(^1S)19d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3,Y1
	g,a	2089.15	2089.16	0.000 –	47 850.9	$3s^2(^1S)3p - 3s^2(^1S)16d$	$^2P^o - {}^2D$	$1/2 - 3/2$	P3,Y1
	g,a	2090.16	2090.13	112.061 –	47 940.7	$3s^2(^1S)3p - 3s^2(^1S)18d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3,Y1
	g,a	2091.70	2091.69	0.000 –	47 793.0	$3s^2(^1S)3p - 3s^2(^1S)15d$	$^2P^o - {}^2D$	$1/2 - 3/2$	P3,Y1
	g,a	2091.92	2091.91	112.061 –	47 900.1	$3s^2(^1S)3p - 3s^2(^1S)17d$	$^2P^o - {}^2D$	$3/2 - 5/2$	P3,Y1

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	1	2093.3	2093.35	32 436.796	80 191.9	$3s^2(^1S)3d - 3s3p(^3P^o)5d$	$^2D - ^2D^o$	$5/2 - 5/2$	P4
	g,a	2094.08	2094.06	112.061	47 850.9	$3s^2(^1S)3p - 3s^2(^1S)16d$	$^2P^o - ^2D$	$3/2 - 5/2$	P3,Y1
	g,a	2094.84	2094.84	0.000	47 721.3	$3s^2(^1S)3p - 3s^2(^1S)14d$	$^2P^o - ^2D$	$1/2 - 3/2$	P3,Y1
	g,a	2096.62	2096.61	112.061	47 793.0	$3s^2(^1S)3p - 3s^2(^1S)15d$	$^2P^o - ^2D$	$3/2 - 5/2$	P3,Y1
	g,a	2098.75	2098.74	0.000	47 632.6	$3s^2(^1S)3p - 3s^2(^1S)13d$	$^2P^o - ^2D$	$1/2 - 3/2$	P3,Y1
	g,a	2099.10	2099.06	112.061	[47 737.41]	$3s^2(^1S)3p - 3s^2(^1S)16s$	$^2P^o - ^2S$	$3/2 - 1/2$	P3
	g,a	2099.79	2099.77	112.061	47 721.3	$3s^2(^1S)3p - 3s^2(^1S)14d$	$^2P^o - ^2D$	$3/2 - 5/2$	P3,Y1
	g,a	2102.58	2102.55	0.000	[47 546.12]	$3s^2(^1S)3p - 3s^2(^1S)14s$	$^2P^o - ^2S$	$1/2 - 1/2$	P3
	g,a	2102.85	2102.80	112.061	[47 652.58]	$3s^2(^1S)3p - 3s^2(^1S)15s$	$^2P^o - ^2S$	$3/2 - 1/2$	P3
	g,a	2103.66	2103.66	0.000	47 521.1	$3s^2(^1S)3p - 3s^2(^1S)12d$	$^2P^o - ^2D$	$1/2 - 3/2$	P3
	g,a	2103.71	2103.69	112.061	47 632.6	$3s^2(^1S)3p - 3s^2(^1S)13d$	$^2P^o - ^2D$	$3/2 - 5/2$	P3
	g,a	2107.55	2107.52	112.061	[47 546.12]	$3s^2(^1S)3p - 3s^2(^1S)14s$	$^2P^o - ^2S$	$3/2 - 1/2$	P3
	g,a	2108.62	2108.59	0.000	[47 409.97]	$3s^2(^1S)3p - 3s^2(^1S)13s$	$^2P^o - ^2S$	$1/2 - 1/2$	P3,Y1
			2108.63	112.061	47 521.1	$3s^2(^1S)3p - 3s^2(^1S)12d$	$^2P^o - ^2D$	$3/2 - 5/2$	
	g,a	2109.99	2109.99	0.000	47 378.7	$3s^2(^1S)3p - 3s^2(^1S)11d$	$^2P^o - ^2D$	$1/2 - 3/2$	P3,Y1
	g,a	2113.61	2113.59	112.061	[47 409.97]	$3s^2(^1S)3p - 3s^2(^1S)13s$	$^2P^o - ^2S$	$3/2 - 1/2$	P3,Y1
	g,a	2114.968	2114.968	112.061	47 379.14	$3s^2(^1S)3p - 3s^2(^1S)11d$	$^2P^o - ^2D$	$3/2 - 5/2$	E3
	g,a	2116.56	2116.54	0.000	[47 232.00]	$3s^2(^1S)3p - 3s^2(^1S)12s$	$^2P^o - ^2S$	$1/2 - 1/2$	P3,Y1
	g,a	2118.312	2118.316	0.000	47 192.38	$3s^2(^1S)3p - 3s^2(^1S)10d$	$^2P^o - ^2D$	$1/2 - 3/2$	E3
	g,a	2121.59	2121.57	112.061	[47 232.00]	$3s^2(^1S)3p - 3s^2(^1S)12s$	$^2P^o - ^2S$	$3/2 - 1/2$	P3,Y1
	1g	2123.362	2123.362	112.061	47 192.3	$3s^2(^1S)3p - 3s^2(^1S)10d$	$^2P^o - ^2D$	$3/2 - 5/2$	E1
	g,a	2127.30	2127.30	0.000	[46 993.11]	$3s^2(^1S)3p - 3s^2(^1S)11s$	$^2P^o - ^2S$	$1/2 - 1/2$	P3
	1g	2129.663	2129.663	0.000	46 940.97	$3s^2(^1S)3p - 3s^2(^1S)9d$	$^2P^o - ^2D$	$1/2 - 3/2$	E1
	g,a	2132.39	2132.39	112.061	[46 993.11]	$3s^2(^1S)3p - 3s^2(^1S)11s$	$^2P^o - ^2S$	$3/2 - 1/2$	P3
	2g	2134.733	2134.733	112.061	46 941.55	$3s^2(^1S)3p - 3s^2(^1S)9d$	$^2P^o - ^2D$	$3/2 - 5/2$	E1
	g,a	2142.39	2142.40	0.000	[46 661.93]	$3s^2(^1S)3p - 3s^2(^1S)10s$	$^2P^o - ^2S$	$1/2 - 1/2$	P3
	3g	2145.555	2145.555	0.000	46 593.32	$3s^2(^1S)3p - 3s^2(^1S)8d$	$^2P^o - ^2D$	$1/2 - 3/2$	E1
	g,a	2147.54	2147.56	112.061	[46 661.93]	$3s^2(^1S)3p - 3s^2(^1S)10s$	$^2P^o - ^2S$	$3/2 - 1/2$	P3
	5g	2150.699	2150.699	112.061	46 593.95	$3s^2(^1S)3p - 3s^2(^1S)8d$	$^2P^o - ^2D$	$3/2 - 5/2$	E1
	3	2160.383	2160.387	32 436.796	78 710.26	$3s^2(^1S)3d - 3s3p(^3P^o)4d$	$^2D - ^2F^o$	$5/2 - 7/2$	E1
	g	2164.55	2164.5774	0.000	46 183.895	$3s^2(^1S)3p - 3s^2(^1S)9s$	$^2P^o - ^2S$	$1/2 - 1/2$	P4
	2	2164.915	2164.911	32 435.453	78 612.23	$3s^2(^1S)3d - 3s3p(^3P^o)4d$	$^2D - ^2F^o$	$3/2 - 5/2$	E1
UV9	1g	2168.805	2168.8265	0.000	46 093.424	$3s^2(^1S)3p - 3s^2(^1S)7d$	$^2P^o - ^2D$	$1/2 - 3/2$	P4
	g	2169.81	2169.8429	112.061	46 183.895	$3s^2(^1S)3p - 3s^2(^1S)9s$	$^2P^o - ^2S$	$3/2 - 1/2$	P4
UV9	1g	2174.028	2174.0707	112.061	46 094.312	$3s^2(^1S)3p - 3s^2(^1S)7d$	$^2P^o - ^2D$	$3/2 - 5/2$	P4
	4	2177.396	2177.395	29 066.96	74 979.02	$3s3p^2 - 3s3p(^3P^o)5s$	$^4P - ^4P^o$	$3/2 - 5/2$	E1
	5	2180.996	2180.997	29 142.78	74 979.02	$3s3p^2 - 3s3p(^3P^o)5s$	$^4P - ^4P^o$	$5/2 - 5/2$	E1
UV8	1g	2199.150	2199.1827	0.000	45 457.244	$3s^2(^1S)3p - 3s^2(^1S)8s$	$^2P^o - ^2S$	$1/2 - 1/2$	P4
UV8	2g	2204.590	2204.6181	112.061	45 457.244	$3s^2(^1S)3p - 3s^2(^1S)8s$	$^2P^o - ^2S$	$3/2 - 1/2$	P4
UV7	2g	2204.660	2204.6676	0.000	45 344.165	$3s^2(^1S)3p - 3s^2(^1S)6d$	$^2P^o - ^2D$	$1/2 - 3/2$	P4
UV7	2g	2210.046	2210.0603	112.061	45 345.594	$3s^2(^1S)3p - 3s^2(^1S)6d$	$^2P^o - ^2D$	$3/2 - 5/2$	P4
UV6	2g	2257.999	2258.0070	0.000	44 273.133	$3s^2(^1S)3p - 3s^2(^1S)7s$	$^2P^o - ^2S$	$1/2 - 1/2$	P4
UV5	4g	2263.462	2263.4644	0.000	44 166.398	$3s^2(^1S)3p - 3s^2(^1S)5d$	$^2P^o - ^2D$	$1/2 - 3/2$	P4
UV6	2g	2263.731	2263.7374	112.061	44 273.133	$3s^2(^1S)3p - 3s^2(^1S)7s$	$^2P^o - ^2S$	$3/2 - 1/2$	P4
	3	2266.014	2266.016	32 436.796	76 553.46	$3s^2(^1S)3d - 3s3p(^3P^o)4d$	$^2D - ^2D^o$	$5/2 - 5/2$	E1
	4	2267.53	2267.58	32 435.453	76 521.7	$3s^2(^1S)3d - 3s3p(^3P^o)4d$	$^2D - ^2D^o$	$3/2 - 3/2$	P4
UV5	4g	2269.096	2269.0963	112.061	44 168.847	$3s^2(^1S)3p - 3s^2(^1S)5d$	$^2P^o - ^2D$	$3/2 - 5/2$	P4
UV5	2g	2269.220	2269.2225	112.061	44 166.398	$3s^2(^1S)3p - 3s^2(^1S)5d$	$^2P^o - ^2D$	$3/2 - 3/2$	P4
UV12	4	2311.035	2311.036	29 020.41	72 277.75	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4P^o$	$1/2 - 1/2$	E1
UV12	5	2312.491	2312.491	29 020.41	72 250.53	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4P^o$	$1/2 - 3/2$	E1
UV12	6	2313.526	2313.526	29 066.96	72 277.75	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4P^o$	$3/2 - 1/2$	E1
UV12	4	2314.983	2314.984	29 066.96	72 250.53	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4P^o$	$3/2 - 3/2$	E1
UV12	7	2317.482	2317.481	29 066.96	72 204.00	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4P^o$	$3/2 - 5/2$	E1
UV12	5	2319.057	2319.056	29 142.78	72 250.53	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4P^o$	$5/2 - 3/2$	E1
UV12	9	2321.562	2321.562	29 142.78	72 204.00	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4P^o$	$5/2 - 5/2$	E1

WAVELENGTHS AND ENERGY LEVELS OF ALUMINUM

Al I — Continued

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
UV4	8g	2367.052	2367.0518	0.000	–	42 233.742	$3s^2(^1S)3p - 3s^2(^1S)4d$	$^2P^o - ^2D$	$1/2 - 3/2$	P4
UV11	8	2367.611	2367.611	29 020.41	–	71 244.17	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4D^o$	$1/2 - 3/2$	E1
UV11	8	2368.112	2368.112	29 020.41	–	71 235.25	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4D^o$	$1/2 - 1/2$	E1
UV11	10	2369.304	2369.305	29 066.96	–	71 260.55	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4D^o$	$3/2 - 5/2$	E1
UV11	9	2370.225	2370.225	29 066.96	–	71 244.17	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4D^o$	$3/2 - 3/2$	E1
UV11	6	2370.726	2370.726	29 066.96	–	71 235.25	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4D^o$	$3/2 - 1/2$	E1
UV3	3g	2372.070	2372.0695	0.000	–	42 144.411	$3s^2(^1S)3p - 3s^2(^1S)6s$	$^2P^o - ^2S$	$1/2 - 1/2$	E1
UV4	8g	2373.124	2373.1220	112.061	–	42 237.783	$3s^2(^1S)3p - 3s^2(^1S)4d$	$^2P^o - ^2D$	$3/2 - 5/2$	P4
UV4	2g	2373.349	2373.3497	112.061	–	42 233.742	$3s^2(^1S)3p - 3s^2(^1S)4d$	$^2P^o - ^2D$	$3/2 - 3/2$	P4
UV11	8	2373.571	2373.570	29 142.78	–	71 260.55	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4D^o$	$5/2 - 5/2$	E1
UV11	4	2374.496	2374.494	29 142.78	–	71 244.17	$3s3p^2 - 3s3p(^3P^o)3d$	$^4P - ^4D^o$	$5/2 - 3/2$	E1
UV3	3g	2378.368	2378.3941	112.061	–	42 144.411	$3s^2(^1S)3p - 3s^2(^1S)6s$	$^2P^o - ^2S$	$3/2 - 1/2$	P4
	5	2423.05	2423.04	38 933.968	–	80 191.9	$3s^2(^1S)nd - 3s3p(^3P^o)5d$	$y^2D - ^2D^o$	$5/2 - 5/2$	P4
	5	2424.77	2424.77	38 929.413	–	80 158.0	$3s^2(^1S)nd - 3s3p(^3P^o)5d$	$y^2D - ^2D^o$	$3/2 - 3/2$	P4
	1	2425.05	2425.03	38 933.968	–	80 158.0	$3s^2(^1S)nd - 3s3p(^3P^o)5d$	$y^2D - ^2D^o$	$5/2 - 3/2$	P4
	5	2459.83	2459.83	32 436.796	–	73 077.8	$3s^2(^1S)3d - 3s3p(^3P^o)3d$	$^2D - ^2F^o$	$5/2 - 7/2$	P4
	4	2465.74	2465.74	32 435.453	–	72 978.9	$3s^2(^1S)3d - 3s3p(^3P^o)3d$	$^2D - ^2F^o$	$3/2 - 5/2$	P4
	5	2513.305	2513.304	38 933.968	–	78 710.26	$3s^2(^1S)nd - 3s3p(^3P^o)4d$	$y^2D - ^2F^o$	$5/2 - 7/2$	E1
	4	2519.222	2519.224	38 929.413	–	78 612.23	$3s^2(^1S)nd - 3s3p(^3P^o)4d$	$y^2D - ^2F^o$	$3/2 - 5/2$	E1
	1	2519.514	2519.514	38 933.968	–	78 612.23	$3s^2(^1S)nd - 3s3p(^3P^o)4d$	$y^2D - ^2F^o$	$5/2 - 5/2$	E1
UV2	10g	2567.984	2567.9823	0.000	–	38 929.413	$3s^2(^1S)3p - 3s^2(^1S)nd$	$^2P^o - y^2D$	$1/2 - 3/2$	P4
UV2	10g	2575.094	2575.0940	112.061	–	38 933.968	$3s^2(^1S)3p - 3s^2(^1S)nd$	$^2P^o - y^2D$	$3/2 - 5/2$	P4
UV2	3g	2575.393	2575.3962	112.061	–	38 929.413	$3s^2(^1S)3p - 3s^2(^1S)nd$	$^2P^o - y^2D$	$3/2 - 3/2$	P4
	2	2633.95	2633.97	42 237.783	–	80 191.9	$3s^2(^1S)4d - 3s3p(^3P^o)5d$	$^2D - ^2D^o$	$5/2 - 5/2$	P4
	2	2636.03	2636.05	42 233.742	–	80 158.0	$3s^2(^1S)4d - 3s3p(^3P^o)5d$	$^2D - ^2D^o$	$3/2 - 3/2$	P4
	1	2636.32	2636.33	42 237.783	–	80 158.0	$3s^2(^1S)4d - 3s3p(^3P^o)5d$	$^2D - ^2D^o$	$5/2 - 3/2$	P4
	6	2647.49	2647.55	32 949.807	–	70 709.4	$3s^2(^1S)4p - 3s3p(^3P^o)4p$	$^2P^o - ^2P$	$1/2 - 1/2$	P4
	4	2648.61	2648.66	32 965.639	–	70 709.4	$3s^2(^1S)4p - 3s3p(^3P^o)4p$	$^2P^o - ^2P$	$3/2 - 1/2$	P4
UV1	10g	2652.484	2652.4758	0.000	–	37 689.407	$3s^2(^1S)3p - 3s^2(^1S)5s$	$^2P^o - ^2S$	$1/2 - 1/2$	P4
	3	2657.406	2657.406	38 933.968	–	76 553.46	$3s^2(^1S)nd - 3s3p(^3P^o)4d$	$y^2D - ^2D^o$	$5/2 - 5/2$	E1
	3	2659.33	2659.33	38 929.413	–	76 521.7	$3s^2(^1S)nd - 3s3p(^3P^o)4d$	$y^2D - ^2D^o$	$3/2 - 3/2$	P4
UV1	10g	2660.393	2660.3863	112.061	–	37 689.407	$3s^2(^1S)3p - 3s^2(^1S)5s$	$^2P^o - ^2S$	$3/2 - 1/2$	P4
	4	2740.980	2740.983	42 237.783	–	78 710.26	$3s^2(^1S)4d - 3s3p(^3P^o)4d$	$^2D - ^2F^o$	$5/2 - 7/2$	E1
	3	2748.065	2748.065	42 233.742	–	78 612.23	$3s^2(^1S)4d - 3s3p(^3P^o)4d$	$^2D - ^2F^o$	$3/2 - 5/2$	E1
	1	2775.19	2775.18	44 168.847	–	80 191.9	$3s^2(^1S)5d - 3s3p(^3P^o)5d$	$^2D - ^2D^o$	$5/2 - 5/2$	P4
	2	2777.63	2777.61	44 166.398	–	80 158.0	$3s^2(^1S)5d - 3s3p(^3P^o)5d$	$^2D - ^2D^o$	$3/2 - 3/2$	P4
UV13	2	2837.856	2837.856	32 435.453	–	67 662.96	$3s^2(^1S)3d - 3s3p(^3P^o)3d$	$^2D - ^2D^o$	$3/2 - 5/2$	E1
UV13	7	2837.963	2837.964	32 436.796	–	67 662.96	$3s^2(^1S)3d - 3s3p(^3P^o)3d$	$^2D - ^2D^o$	$5/2 - 5/2$	E1
UV13	7	2840.099	2840.100	32 435.453	–	67 635.13	$3s^2(^1S)3d - 3s3p(^3P^o)3d$	$^2D - ^2D^o$	$3/2 - 3/2$	E1
UV13	2	2840.205	2840.208	32 436.796	–	67 635.13	$3s^2(^1S)3d - 3s3p(^3P^o)3d$	$^2D - ^2D^o$	$5/2 - 3/2$	E1
	1	2868.92	2868.90	45 345.594	–	80 191.9	$3s^2(^1S)6d - 3s3p(^3P^o)5d$	$^2D - ^2D^o$	$5/2 - 5/2$	P4
	2	2871.57	2871.58	45 344.165	–	80 158.0	$3s^2(^1S)6d - 3s3p(^3P^o)5d$	$^2D - ^2D^o$	$3/2 - 3/2$	P4
	3	2894.228	2894.227	44 168.847	–	78 710.26	$3s^2(^1S)5d - 3s3p(^3P^o)4d$	$^2D - ^2F^o$	$5/2 - 7/2$	E1
	2	2902.258	2902.258	44 166.398	–	78 612.23	$3s^2(^1S)5d - 3s3p(^3P^o)4d$	$^2D - ^2F^o$	$3/2 - 5/2$	E1
	3	2913.267	2913.267	42 237.783	–	76 553.46	$3s^2(^1S)4d - 3s3p(^3P^o)4d$	$^2D - ^2D^o$	$5/2 - 5/2$	E1
	2	2915.66	2915.62	42 233.742	–	76 521.7	$3s^2(^1S)4d - 3s3p(^3P^o)4d$	$^2D - ^2D^o$	$3/2 - 3/2$	P4
	5	2927.930	2927.93	38 933.968	–	73 077.8	$3s^2(^1S)nd - 3s3p(^3P^o)3d$	$y^2D - ^2F^o$	$5/2 - 7/2$	P4
	3	2936.04	2936.04	38 929.413	–	72 978.9	$3s^2(^1S)nd - 3s3p(^3P^o)3d$	$y^2D - ^2F^o$	$3/2 - 5/2$	P4
	3	2996.29	2996.309	45 345.594	–	78 710.26	$3s^2(^1S)6d - 3s3p(^3P^o)4d$	$^2D - ^2F^o$	$5/2 - 7/2$	P4
	1	3005.02	3005.010	45 344.165	–	78 612.23	$3s^2(^1S)6d - 3s3p(^3P^o)4d$	$^2D - ^2F^o$	$3/2 - 5/2$	P4
7	13	3050.073	3050.072	29 066.96	–	61 843.54	$3s3p^2 - 3s3p(^3P^o)4s$	$^4P - ^4P^o$	$3/2 - 5/2$	E1
7	5	3054.679	3054.679	29 020.41	–	61 747.56	$3s3p^2 - 3s3p(^3P^o)4s$	$^4P - ^4P^o$	$1/2 - 3/2$	E1
7	14	3057.144	3057.144	29 142.78	–	61 843.54	$3s3p^2 - 3s3p(^3P^o)4s$	$^4P - ^4P^o$	$5/2 - 5/2$	E1
7	4	3059.029	3059.030	29 066.96	–	61 747.56	$3s3p^2 - 3s3p(^3P^o)4s$	$^4P - ^4P^o$	$3/2 - 3/2$	E1
7	4	3059.924	3059.924	29 020.41	–	61 691.46	$3s3p^2 - 3s3p(^3P^o)4s$	$^4P - ^4P^o$	$1/2 - 1/2$	E1

Al I – Continued

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	*J* Values	Ref.
7	7	3064.290	3064.290	29 066.96 –	61 691.46	$3s3p^2 - 3s3p(^3P^\circ)4s$	$^4P - ^4P^\circ$	$3/2 - 1/2$	E1
	1	3065.12	3065.094	46 094.312 –	78 710.26	$3s^2(^1S)7d - 3s3p(^3P^\circ)4d$	$^2D - ^2F^\circ$	$5/2 - 7/2$	P4
7	5	3066.145	3066.144	29 142.78 –	61 747.56	$3s3p^2 - 3s3p(^3P^\circ)4s$	$^4P - ^4P^\circ$	$5/2 - 3/2$	E1
3	24*g*	3082.1529	3082.1510	0.000 –	32 435.453	$3s^2(^1S)3p - 3s^2(^1S)3d$	$^2P^\circ - ^2D$	$1/2 - 3/2$	E1
	5	3087.02	3086.989	44 168.847 –	76 553.47	$3s^2(^1S)5d - 3s3p(^3P^\circ)4d$	$^2D - ^2D^\circ$	$5/2 - 5/2$	P4
	1	3089.82	3089.79	44 166.398 –	76 521.7	$3s^2(^1S)5d - 3s3p(^3P^\circ)4d$	$^2D - ^2D^\circ$	$3/2 - 3/2$	P4
3	26*g*	3092.7099	3092.7084	112.061 –	32 436.796	$3s^2(^1S)3p - 3s^2(^1S)3d$	$^2P^\circ - ^2D$	$3/2 - 5/2$	E1
3	20*g*	3092.8386	3092.8369	112.061 –	32 435.453	$3s^2(^1S)3p - 3s^2(^1S)3d$	$^2P^\circ - ^2D$	$3/2 - 3/2$	E1
	4	3203.39	3203.394	45 345.594 –	76 553.47	$3s^2(^1S)6d - 3s3p(^3P^\circ)4d$	$^2D - ^2D^\circ$	$5/2 - 5/2$	P4
	3	3241.59	3241.60	42 237.783 –	73 077.8	$3s^2(^1S)4d - 3s3p(^3P^\circ)3d$	$^2D - ^2F^\circ$	$5/2 - 7/2$	P4
	2	3251.60	3251.61	42 233.742 –	72 978.9	$3s^2(^1S)4d - 3s3p(^3P^\circ)3d$	$^2D - ^2F^\circ$	$3/2 - 5/2$	P4
	3	3282.20	3282.139	46 094.312 –	76 553.47	$3s^2(^1S)7d - 3s3p(^3P^\circ)4d$	$^2D - ^2D^\circ$	$5/2 - 5/2$	P4
2	6*g*	3439.347	3439.346	0.000 –	29 066.96	$3s^2(^1S)3p - 3s3p^2$	$^2P^\circ - ^4P$	$1/2 - 3/2$	E1
2	9*g*	3443.640	3443.640	112.061 –	29 142.78	$3s^2(^1S)3p - 3s3p^2$	$^2P^\circ - ^4P$	$3/2 - 5/2$	E1
2	6*g*	3444.865	3444.863	0.000 –	29 020.41	$3s^2(^1S)3p - 3s3p^2$	$^2P^\circ - ^4P$	$1/2 - 1/2$	E1
2	2*g*	3452.657	3452.658	112.061 –	29 066.96	$3s^2(^1S)3p - 3s3p^2$	$^2P^\circ - ^4P$	$3/2 - 3/2$	E1
2	6*g*	3458.216	{ 3458.15?	44 168.847 –	73 077.8?	$3s^2(^1S)5d - 3s3p(^3P^\circ)3d$	$^2D - ^2F^\circ$	$5/2 - 7/2$	E1
2			3458.218	112.061 –	29 020.41	$3s^2(^1S)3p - 3s3p^2$	$^2P^\circ - ^4P$	$3/2 - 1/2$	
	1	3469.80	3469.72?	44 166.398 –	72 978.9?	$3s^2(^1S)5d - 3s3p(^3P^\circ)3d$	$^2D - ^2F^\circ$	$3/2 - 5/2$	P4
17	5	3479.806	3479.808	38 933.968 –	67 662.96	$3s^2(^1S)nd - 3s3p(^3P^\circ)3d$	$y\,^2D - ^2D^\circ$	$5/2 - 5/2$	E1
17	5	3482.628	3482.630	38 929.413 –	67 635.13	$3s^2(^1S)nd - 3s3p(^3P^\circ)3d$	$y\,^2D - ^2D^\circ$	$3/2 - 3/2$	E1
18	5	3931.996	3931.996	42 237.783 –	67 662.96	$3s^2(^1S)4d - 3s3p(^3P^\circ)3d$	$^2D - ^2D^\circ$	$5/2 - 5/2$	E1
18	4	3935.677	3935.679	42 233.742 –	67 635.13	$3s^2(^1S)4d - 3s3p(^3P^\circ)3d$	$^2D - ^2D^\circ$	$3/2 - 3/2$	E1
1	24*g*	3944.0058	3944.0060	0.000 –	25 347.756	$3s^2(^1S)3p - 3s^2(^1S)4s$	$^2P^\circ - ^2S$	$1/2 - 1/2$	E1
1	26*g*	3961.5200	3961.5201	112.061 –	25 347.756	$3s^2(^1S)3p - 3s^2(^1S)4s$	$^2P^\circ - ^2S$	$3/2 - 1/2$	E1
	2	4255.12	4255.188	44 168.847 –	67 662.96	$3s^2(^1S)5d - 3s3p(^3P^\circ)3d$	$^2D - ^2D^\circ$	$5/2 - 5/2$	P4
	6	5107.520	5107.517	25 347.756 –	44 921.287	$3s^2(^1S)4s - 3s^2(^1S)7p$	$^2S - ^2P^\circ$	$1/2 - 3/2$	E1
	4	5107.943	5107.940	25 347.756 –	44 919.666	$3s^2(^1S)4s - 3s^2(^1S)7p$	$^2S - ^2P^\circ$	$1/2 - 1/2$	E1
6	10	5557.063	5557.059	25 347.756 –	43 337.889	$3s^2(^1S)4s - 3s^2(^1S)6p$	$^2S - ^2P^\circ$	$1/2 - 3/2$	E1
6	8	5557.948	5557.944	25 347.756 –	43 335.024	$3s^2(^1S)4s - 3s^2(^1S)6p$	$^2S - ^2P^\circ$	$1/2 - 1/2$	E1
		6324.67	6324.687	32 435.453 –	48 242.14	$3s^2(^1S)3d - 3s^2(^1S)55f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6325.23	{ 6325.225	32 436.796 –	48 242.14	$3s^2(^1S)3d - 3s^2(^1S)55f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
			6325.232	32 435.453 –	48 240.78	$3s^2(^1S)3d - 3s^2(^1S)54f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	
		6325.77	6325.769	32 436.796 –	48 240.78	$3s^2(^1S)3d - 3s^2(^1S)54f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6325.82	6325.812	32 435.453 –	48 239.33	$3s^2(^1S)3d - 3s^2(^1S)53f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6326.35	6326.350	32 436.796 –	48 239.33	$3s^2(^1S)3d - 3s^2(^1S)53f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6326.41	6326.425	32 435.453 –	48 237.80	$3s^2(^1S)3d - 3s^2(^1S)52f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6326.98	6326.962	32 436.796 –	48 237.80	$3s^2(^1S)3d - 3s^2(^1S)52f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6327.07	6327.085	32 435.453 –	48 236.15	$3s^2(^1S)3d - 3s^2(^1S)51f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6327.64	6327.623	32 436.796 –	48 236.15	$3s^2(^1S)3d - 3s^2(^1S)51f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6327.75	6327.754	32 435.453 –	48 234.48	$3s^2(^1S)3d - 3s^2(^1S)50f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6328.29	6328.292	32 436.796 –	48 234.48	$3s^2(^1S)3d - 3s^2(^1S)50f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6328.47	6328.475	32 435.453 –	48 232.68	$3s^2(^1S)3d - 3s^2(^1S)49f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6329.02	6329.013	32 436.796 –	48 232.68	$3s^2(^1S)3d - 3s^2(^1S)49f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6329.25	6329.256	32 435.453 –	48 230.73	$3s^2(^1S)3d - 3s^2(^1S)48f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6329.80	6329.794	32 436.796 –	48 230.73	$3s^2(^1S)3d - 3s^2(^1S)48f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6330.06	6330.066	32 435.453 –	48 228.71	$3s^2(^1S)3d - 3s^2(^1S)47f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6330.61	6330.604	32 436.796 –	48 228.71	$3s^2(^1S)3d - 3s^2(^1S)47f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6330.95	6330.936	32 435.453 –	48 226.54	$3s^2(^1S)3d - 3s^2(^1S)46f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6331.47	6331.474	32 436.796 –	48 226.54	$3s^2(^1S)3d - 3s^2(^1S)46f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6331.88	6331.874	32 435.453 –	48 224.20	$3s^2(^1S)3d - 3s^2(^1S)45f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6332.41	6332.413	32 436.796 –	48 224.20	$3s^2(^1S)3d - 3s^2(^1S)45f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6332.88	6332.869	32 435.453 –	48 221.72	$3s^2(^1S)3d - 3s^2(^1S)44f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1
		6333.40	6333.408	32 436.796 –	48 221.72	$3s^2(^1S)3d - 3s^2(^1S)44f$	$^2D - ^2F^\circ$	$5/2 - 7/2$	Z1
		6333.97	6333.960	32 435.453 –	48 219.00	$3s^2(^1S)3d - 3s^2(^1S)43f$	$^2D - ^2F^\circ$	$3/2 - 5/2$	Z1

Al I — Continued

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
		6334.49	6334.499	32 436.796 –	48 219.00	$3s^2(^1S)3d - 3s^2(^1S)43f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6335.09	6335.104	32 435.453 –	48 216.15	$3s^2(^1S)3d - 3s^2(^1S)42f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6335.65	6335.643	32 436.796 –	48 216.15	$3s^2(^1S)3d - 3s^2(^1S)42f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6336.34	6336.366	32 435.496 –	48 213.05	$3s^2(^1S)3d - 3s^2(^1S)41f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6336.89	6336.888	32 436.796 –	48 213.05	$3s^2(^1S)3d - 3s^2(^1S)41f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6337.67	6337.674	32 435.453 –	48 209.75	$3s^2(^1S)3d - 3s^2(^1S)40f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6338.22	6338.214	32 436.796 –	48 209.75	$3s^2(^1S)3d - 3s^2(^1S)40f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6339.11	6339.101	32 435.453 –	48 206.20	$3s^2(^1S)3d - 3s^2(^1S)39f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6339.63	6339.641	32 436.796 –	48 206.20	$3s^2(^1S)3d - 3s^2(^1S)39f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6340.66	6340.657	32 435.453 –	48 202.33	$3s^2(^1S)3d - 3s^2(^1S)38f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6341.19	6341.197	32 436.796 –	48 202.33	$3s^2(^1S)3d - 3s^2(^1S)38f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6342.35	6342.375	32 435.453 –	48 198.06	$3s^2(^1S)3d - 3s^2(^1S)37f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6342.93	6342.915	32 436.796 –	48 198.06	$3s^2(^1S)3d - 3s^2(^1S)37f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6344.17	6344.182	32 435.453 –	48 193.57	$3s^2(^1S)3d - 3s^2(^1S)36f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6344.73	6344.722	32 436.796 –	48 193.57	$3s^2(^1S)3d - 3s^2(^1S)36f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6346.15	6346.143	32 435.453 –	48 188.70	$3s^2(^1S)3d - 3s^2(^1S)35f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6346.68	6346.684	32 436.796 –	48 188.70	$3s^2(^1S)3d - 3s^2(^1S)35f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6348.30	6348.315	32 435.453 –	48 183.31	$3s^2(^1S)3d - 3s^2(^1S)34f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6348.87	6348.857	32 436.796 –	48 183.31	$3s^2(^1S)3d - 3s^2(^1S)34f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6350.67	6350.670	32 435.453 –	48 177.47	$3s^2(^1S)3d - 3s^2(^1S)33f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6351.21	6351.212	32 436.796 –	48 177.47	$3s^2(^1S)3d - 3s^2(^1S)33f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6353.26	6353.273	32 435.453 –	48 171.02	$3s^2(^1S)3d - 3s^2(^1S)32f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6353.82	6353.816	32 436.796 –	48 171.02	$3s^2(^1S)3d - 3s^2(^1S)32f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6356.12	6356.117	32 435.453 –	48 163.98	$3s^2(^1S)3d - 3s^2(^1S)31f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6356.66	6356.660	32 436.796 –	48 163.98	$3s^2(^1S)3d - 3s^2(^1S)31f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6359.26	6359.263	32 435.453 –	48 156.20	$3s^2(^1S)3d - 3s^2(^1S)30f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6359.81	6359.806	32 436.796 –	48 156.20	$3s^2(^1S)3d - 3s^2(^1S)30f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6362.74	6362.743	32 435.453 –	48 147.60	$3s^2(^1S)3d - 3s^2(^1S)29f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6363.29	6363.287	32 436.796 –	48 147.60	$3s^2(^1S)3d - 3s^2(^1S)29f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6366.60	6366.597	32 435.453 –	48 138.09	$3s^2(^1S)3d - 3s^2(^1S)28f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6367.14	6367.142	32 436.796 –	48 138.09	$3s^2(^1S)3d - 3s^2(^1S)28f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6370.91	6370.918	32 435.453 –	48 127.44	$3s^2(^1S)3d - 3s^2(^1S)27f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6371.47	6371.463	32 436.796 –	48 127.44	$3s^2(^1S)3d - 3s^2(^1S)27f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6375.71	6375.712	32 435.453 –	48 115.64	$3s^2(^1S)3d - 3s^2(^1S)26f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6376.26	6376.258	32 436.796 –	48 115.64	$3s^2(^1S)3d - 3s^2(^1S)26f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6381.14	6381.137	32 435.453 –	48 102.31	$3s^2(^1S)3d - 3s^2(^1S)25f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6381.68	6381.684	32 436.796 –	48 102.31	$3s^2(^1S)3d - 3s^2(^1S)25f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6387.24	6387.240	32 435.453 –	48 087.34	$3s^2(^1S)3d - 3s^2(^1S)24f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6387.79	6387.788	32 436.796 –	48 087.34	$3s^2(^1S)3d - 3s^2(^1S)24f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6394.18	6394.198	32 435.453 –	48 070.31	$3s^2(^1S)3d - 3s^2(^1S)23f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6394.76	6394.747	32 436.796 –	48 070.31	$3s^2(^1S)3d - 3s^2(^1S)23f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6402.16	6402.154	32 435.453 –	48 050.88	$3s^2(^1S)3d - 3s^2(^1S)22f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6402.71	6402.704	32 436.796 –	48 050.88	$3s^2(^1S)3d - 3s^2(^1S)22f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6411.25	6411.264	32 435.453 –	48 028.69	$3s^2(^1S)3d - 3s^2(^1S)21f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6411.83	6411.817	32 436.796 –	48 028.69	$3s^2(^1S)3d - 3s^2(^1S)21f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6421.84	6421.840	32 435.453 –	48 003.01	$3s^2(^1S)3d - 3s^2(^1S)20f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6422.40	6422.395	32 436.796 –	48 003.01	$3s^2(^1S)3d - 3s^2(^1S)20f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6434.16	6434.149	32 435.453 –	47 973.23	$3s^2(^1S)3d - 3s^2(^1S)19f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6434.70	6434.705	32 436.796 –	47 973.23	$3s^2(^1S)3d - 3s^2(^1S)19f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6448.62	6448.608	32 435.453 –	47 938.39	$3s^2(^1S)3d - 3s^2(^1S)18f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6449.16	6449.167	32 436.796 –	47 938.39	$3s^2(^1S)3d - 3s^2(^1S)18f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6465.86	6465.859	32 435.453 –	47 897.03	$3s^2(^1S)3d - 3s^2(^1S)17f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6486.51	6486.516	32 435.453 –	47 847.79	$3s^2(^1S)3d - 3s^2(^1S)16f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1
		6487.08	6487.082	32 436.796 –	47 847.79	$3s^2(^1S)3d - 3s^2(^1S)16f$	$^2D - ^2F^\circ$	5/2 – 7/2	Z1
		6511.66	6511.676	32 435.453 –	47 788.24	$3s^2(^1S)3d - 3s^2(^1S)15f$	$^2D - ^2F^\circ$	3/2 – 5/2	Z1

Al I – Continued

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
		6512.27	6512.246	32 436.796 –	47 788.24	$3s^2(^1S)3d - 3s^2(^1S)15f$	$^2D - ^2F^o$	$5/2 - 7/2$	Z1
		6542.67	6542.666	32 435.453 –	47 715.52	$3s^2(^1S)3d - 3s^2(^1S)14f$	$^2D - ^2F^o$	$3/2 - 5/2$	Z1
		6543.24	6543.242	32 436.796 –	47 715.52	$3s^2(^1S)3d - 3s^2(^1S)14f$	$^2D - ^2F^o$	$5/2 - 7/2$	Z1
		6581.55	6581.540	32 435.453 –	47 625.27	$3s^2(^1S)3d - 3s^2(^1S)13f$	$^2D - ^2F^o$	$3/2 - 5/2$	Z1
		6582.11	6582.122	32 436.796 –	47 625.27	$3s^2(^1S)3d - 3s^2(^1S)13f$	$^2D - ^2F^o$	$5/2 - 7/2$	Z1
		6631.20	6631.172	32 435.453 –	47 511.58	$3s^2(^1S)3d - 3s^2(^1S)12f$	$^2D - ^2F^o$	$3/2 - 5/2$	Z1
		6631.74	6631.763	32 436.796 –	47 511.58	$3s^2(^1S)3d - 3s^2(^1S)12f$	$^2D - ^2F^o$	$5/2 - 7/2$	Z1
5	13	6696.015	6696.018	25 347.756 –	40 277.883	$3s^2(^1S)4s - 3s^2(^1S)5p$	$^2S - ^2P^o$	$1/2 - 3/2$	E1
		6696.12	6696.139	32 435.453 –	47 365.31	$3s^2(^1S)3d - 3s^2(^1S)11f$	$^2D - ^2F^o$	$3/2 - 5/2$	Z1
		6696.76	6696.741	32 436.796 –	47 365.31	$3s^2(^1S)3d - 3s^2(^1S)11f$	$^2D - ^2F^o$	$5/2 - 7/2$	Z1
5	11	6698.673	6698.667	25 347.756 –	40 271.978	$3s^2(^1S)4s - 3s^2(^1S)5p$	$^2S - ^2P^o$	$1/2 - 1/2$	E1
	1	6785.2	6784.24	32 436.796 –	[47 172.77]	$3s^2(^1S)3d - 3s^2(^1S)10f$	$^2D - ^2F^o$	$5/2 - 7/2$	S1
	3	6906.4	6906.28	32 436.796 –	[46 912.38]	$3s^2(^1S)3d - 3s^2(^1S)9f$	$^2D - ^2F^o$	$5/2 - 7/2$	S1
	5	7083.968	7083.969	32 435.453 –	46 547.942	$3s^2(^1S)3d - 3s^2(^1S)8f$	$^2D - ^2F^o$	$3/2 - 5/2$	E1
	6	7084.644	7084.643	32 436.796 –	46 547.942	$3s^2(^1S)3d - 3s^2(^1S)8f$	$^2D - ^2F^o$	$5/2 - 7/2$	E1
11	8	7361.568	7361.568	32 435.453 –	46 015.774	$3s^2(^1S)3d - 3s^2(^1S)7f$	$^2D - ^2F^o$	$3/2 - 5/2$	E1
11	9	7362.297	7362.296	32 436.796 –	46 015.774	$3s^2(^1S)3d - 3s^2(^1S)7f$	$^2D - ^2F^o$	$5/2 - 7/2$	E1
	1	7554.162	7554.164	32 949.807 –	46 183.895	$3s^2(^1S)4p - 3s^2(^1S)9s$	$^2P^o - ^2S$	$1/2 - 1/2$	E1
	3	7563.214	7563.212	32 965.639 –	46 183.895	$3s^2(^1S)4p - 3s^2(^1S)9s$	$^2P^o - ^2S$	$3/2 - 1/2$	E1
	5	7606.159	7606.162	32 949.807 –	46 093.424	$3s^2(^1S)4p - 3s^2(^1S)7d$	$^2P^o - ^2D$	$1/2 - 3/2$	E1
	7	7614.820	7614.820	32 965.639 –	46 094.312	$3s^2(^1S)4p - 3s^2(^1S)7d$	$^2P^o - ^2D$	$3/2 - 5/2$	E1
	1	7615.339	7615.335	32 965.639 –	46 093.424	$3s^2(^1S)4p - 3s^2(^1S)7d$	$^2P^o - ^2D$	$3/2 - 3/2$	E1
10	11	7835.309	7835.309	32 435.453 –	45 194.681	$3s^2(^1S)3d - 3s^2(^1S)6f$	$^2D - ^2F^o$	$3/2 - 5/2$	E1
10	12	7836.134	7836.134	32 436.796 –	45 194.681	$3s^2(^1S)3d - 3s^2(^1S)6f$	$^2D - ^2F^o$	$5/2 - 7/2$	E1
	5	7993.048	7993.045	32 949.807 –	45 457.244	$3s^2(^1S)4p - 3s^2(^1S)8s$	$^2P^o - ^2S$	$1/2 - 1/2$	E1
	7	8003.186	8003.175	32 965.639 –	45 457.244	$3s^2(^1S)4p - 3s^2(^1S)8s$	$^2P^o - ^2S$	$3/2 - 1/2$	E1
16	6	8065.968	8065.969	32 949.807 –	45 344.165	$3s^2(^1S)4p - 3s^2(^1S)6d$	$^2P^o - ^2D$	$1/2 - 3/2$	E1
16	8	8075.353	8075.353	32 965.639 –	45 345.594	$3s^2(^1S)4p - 3s^2(^1S)6d$	$^2P^o - ^2D$	$3/2 - 5/2$	E1
16	2	8076.289	8076.285	32 965.639 –	45 344.165	$3s^2(^1S)4p - 3s^2(^1S)6d$	$^2P^o - ^2D$	$3/2 - 3/2$	E1
9	13	8772.866	8772.871	32 435.453 –	43 831.101	$3s^2(^1S)3d - 3s^2(^1S)5f$	$^2D - ^2F^o$	$3/2 - 5/2$	E1
9	14	8773.896	8773.902	32 436.796 –	43 831.105	$3s^2(^1S)3d - 3s^2(^1S)5f$	$^2D - ^2F^o$	$5/2 - 7/2$	E1
15	8	8828.909	8828.903	32 949.807 –	44 273.133	$3s^2(^1S)4p - 3s^2(^1S)7s$	$^2P^o - ^2S$	$1/2 - 1/2$	E1
15	10	8841.277	8841.265	32 965.639 –	44 273.133	$3s^2(^1S)4p - 3s^2(^1S)7s$	$^2P^o - ^2S$	$3/2 - 1/2$	E1
14	7	8912.900	8912.918	32 949.807 –	44 166.398	$3s^2(^1S)4p - 3s^2(^1S)5d$	$^2P^o - ^2D$	$1/2 - 3/2$	E1
14	9	8923.555	8923.565	32 965.639 –	44 168.847	$3s^2(^1S)4p - 3s^2(^1S)5d$	$^2P^o - ^2D$	$3/2 - 5/2$	E1
14	4	8925.504	8925.516	32 965.639 –	44 166.398	$3s^2(^1S)4p - 3s^2(^1S)5d$	$^2P^o - ^2D$	$3/2 - 3/2$	E1
	5	9089.906	9089.906	56 636.933 –	67 635.128	$3s3p^2 - 3s3p(^3P^o)3d$	$^2P - ^2D^o$	$1/2 - 3/2$	E1
	6	9139.950	9139.947	56 724.980 –	67 662.960	$3s3p^2 - 3s3p(^3P^o)3d$	$^2P - ^2D^o$	$3/2 - 5/2$	E1
	2	9163.261	9163.264	56 724.980 –	67 635.128	$3s3p^2 - 3s3p(^3P^o)3d$	$^2P - ^2D^o$	$3/2 - 3/2$	E1
		Wavenumber (cm^{-1})							
13	8	9283.919	9283.935	32 949.807 –	42 233.742	$3s^2(^1S)4p - 3s^2(^1S)4d$	$^2P^o - ^2D$	$1/2 - 3/2$	E1
13	9	9272.138	9272.144	32 965.639 –	42 237.783	$3s^2(^1S)4p - 3s^2(^1S)4d$	$^2P^o - ^2D$	$3/2 - 5/2$	E1
13	4	9268.077	9268.103	32 965.639 –	42 233.742	$3s^2(^1S)4p - 3s^2(^1S)4d$	$^2P^o - ^2D$	$3/2 - 3/2$	E1
12	10	9194.596	9194.604	32 949.807 –	42 144.411	$3s^2(^1S)4p - 3s^2(^1S)6s$	$^2P^o - ^2S$	$1/2 - 1/2$	E1
12	11	9178.761	9178.772	32 965.639 –	42 144.411	$3s^2(^1S)4p - 3s^2(^1S)6s$	$^2P^o - ^2S$	$3/2 - 1/2$	E1
8	630	8883.937	8883.937	32 435.453 –	41 319.390	$3s^2(^1S)3d - 3s^2(^1S)4f$	$^2D - ^2F^o$	$3/2 - 5/2$	B1
8	440*d*	8882.566	{ 8882.602	32 436.796 –	41 319.398	$3s^2(^1S)3d - 3s^2(^1S)4f$	$^2D - ^2F^o$	$5/2 - 7/2$	B1
8			{ 8882.584	32 436.796 –	41 319.380	$3s^2(^1S)3d - 3s^2(^1S)4f$	$^2D - ^2F^o$	$5/2 - 5/2$	
	8	7842.425	7842.430	32 435.453 –	40 277.883	$3s^2(^1S)3d - 3s^2(^1S)5p$	$^2D - ^2P^o$	$3/2 - 3/2$	B1
	13*d*	7841.048	7841.087	32 436.796 –	40 277.883	$3s^2(^1S)3d - 3s^2(^1S)5p$	$^2D - ^2P^o$	$5/2 - 3/2$	B1
	17	7836.521	7836.525	32 435.453 –	40 271.978	$3s^2(^1S)3d - 3s^2(^1S)5p$	$^2D - ^2P^o$	$3/2 - 1/2$	B1

Al I — Continued

Mult. No.	Rel. Int.	Wavenumber (cm^{-1}) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
4	71000	7617.906	7617.883	25 347.756	32 965.639	$3s^2(^1S)4s - 3s^2(^1S)4p$	$^2S - ^2P^o$	1/2 – 3/2	B1
4	100000	7617.868							B1
4	36300	7602.074	7602.051	25 347.756	32 949.807	$3s^2(^1S)4s - 3s^2(^1S)4p$	$^2S - ^2P^o$	1/2 – 1/2	B1
4	50000	7602.029							B1
	3	7231.893	7231.880	37 689.407	44 921.287	$3s^2(^1S)5s - 3s^2(^1S)7p$	$^2S - ^2P^o$	1/2 – 3/2	B1
	3	6265.279	6265.268	38 929.413	45 194.681	$3s^2(^1S)nd - 3s^2(^1S)6f$	$y\,^2D - ^2F^o$	3/2 – 5/2	B1
	3	6260.76	6260.713	38 933.968	45 194.681	$3s^2(^1S)nd - 3s^2(^1S)6f$	$y\,^2D - ^2F^o$	5/2 – 7/2	B1
	3	6260.72							B1
	3	6260.67							B1
	11500	5979.595	5979.606	32 949.807	38 929.413	$3s^2(^1S)4p - 3s^2(^1S)nd$	$^2P^o - y\,^2D$	1/2 – 3/2	B1
	13200	5968.366	5968.329	32 965.639	38 933.968	$3s^2(^1S)4p - 3s^2(^1S)nd$	$^2P^o - y\,^2D$	3/2 – 5/2	B1
	11500	5968.355							B1
	10000	5968.305							B1
	8900	5968.290							B1
	2300	5963.759	5963.774	32 965.639	38 929.413	$3s^2(^1S)4p - 3s^2(^1S)nd$	$^2P^o - y\,^2D$	3/2 – 3/2	B1
	65	5648.478	5648.482	37 689.407	43 337.889	$3s^2(^1S)5s - 3s^2(^1S)6p$	$^2S - ^2P^o$	1/2 – 3/2	B1
	30	5645.612	5645.617	37 689.407	43 335.024	$3s^2(^1S)5s - 3s^2(^1S)6p$	$^2S - ^2P^o$	1/2 – 1/2	B1
	1	5185.267	5185.266	40 271.978	45 457.244	$3s^2(^1S)5p - 3s^2(^1S)8s$	$^2P^o - ^2S$	1/2 – 1/2	B1
	3	5179.362	5179.361	40 277.883	45 457.244	$3s^2(^1S)5p - 3s^2(^1S)8s$	$^2P^o - ^2S$	3/2 – 1/2	B1
	4	4901.690	4901.688	38 929.413	43 831.101	$3s^2(^1S)nd - 3s^2(^1S)5f$	$y\,^2D - ^2F^o$	3/2 – 5/2	B1
	4	4897.159	4897.137	38 933.968	43 831.105	$3s^2(^1S)nd - 3s^2(^1S)5f$	$y\,^2D - ^2F^o$	5/2 – 7/2	B1
	3	4897.128	4897.133	38 933.968	43 831.101	$3s^2(^1S)nd - 3s^2(^1S)5f$	$y\,^2D - ^2F^o$	5/2 – 5/2	B1
	3	4897.091							B1
	4700	4739.598	4739.600	32 949.807	37 689.407	$3s^2(^1S)4p - 3s^2(^1S)5s$	$^2P^o - ^2S$	1/2 – 1/2	B1
	12000	4723.760	4723.768	32 965.639	37 689.407	$3s^2(^1S)4p - 3s^2(^1S)5s$	$^2P^o - ^2S$	3/2 – 1/2	B1
	2	4713.876	4713.881	41 319.390	46 033.271	$3s^2(^1S)4f - 3s^2(^1S)7g$	$^2F^o - ^2G$	5/2 – 7/2	B1
			4713.873	41 319.398	46 033.271	$3s^2(^1S)4f - 3s^2(^1S)7g$	$^2F^o - ^2G$	7/2 – 9/2	
	1	4408.464	4408.476	38 929.413	43 337.889	$3s^2(^1S)nd - 3s^2(^1S)6p$	$y\,^2D - ^2P^o$	3/2 – 3/2	B1
	4	4405.610	4405.611	38 929.413	43 335.024	$3s^2(^1S)nd - 3s^2(^1S)6p$	$y\,^2D - ^2P^o$	3/2 – 1/2	B1
	3	4403.958	4403.921	38 933.968	43 337.889	$3s^2(^1S)nd - 3s^2(^1S)6p$	$y\,^2D - ^2P^o$	5/2 – 3/2	B1
	3	4403.932							B1
	3	4403.905							B1
	4	4403.872							B1
	9	4001.160	4001.155	40 271.978	44 273.133	$3s^2(^1S)5p - 3s^2(^1S)7s$	$^2P^o - ^2S$	1/2 – 1/2	B1
	16	3995.255	3995.250	40 277.883	44 273.133	$3s^2(^1S)5p - 3s^2(^1S)7s$	$^2P^o - ^2S$	3/2 – 1/2	B1
	25*d*	3902.323	3902.328	41 319.390	45 221.718	$3s^2(^1S)4f - 3s^2(^1S)6g$	$^2F^o - ^2G$	5/2 – 7/2	B1
			3902.320	41 319.398	45 221.718	$3s^2(^1S)4f - 3s^2(^1S)6g$	$^2F^o - ^2G$	7/2 – 9/2	
	1	3894.426	3894.420	40 271.978	44 166.398	$3s^2(^1S)5p - 3s^2(^1S)5d$	$^2P^o - ^2D$	1/2 – 3/2	B1
	1	3890.972	3890.964	40 277.883	44 168.847	$3s^2(^1S)5p - 3s^2(^1S)5d$	$^2P^o - ^2D$	3/2 – 5/2	B1
	10	2960.94	2960.939	42 233.742	45 194.681	$3s^2(^1S)4d - 3s^2(^1S)6f$	$^2D - ^2F^o$	3/2 – 5/2	B1
	10*d*	2956.90	2956.898	42 237.783	45 194.681	$3s^2(^1S)4d - 3s^2(^1S)6f$	$^2D - ^2F^o$	5/2 – 7/2	B1
	2	2776.887	2776.876	42 144.411	44 921.287	$3s^2(^1S)6s - 3s^2(^1S)7p$	$^2S - ^2P^o$	1/2 – 3/2	B1
	6	2775.287	2775.255	42 144.411	44 919.666	$3s^2(^1S)6s - 3s^2(^1S)7p$	$^2S - ^2P^o$	1/2 – 1/2	B1
	10*d*	2685.95	2685.924	42 233.742	44 919.666	$3s^2(^1S)4d - 3s^2(^1S)7p$	$^2D - ^2P^o$	3/2 – 1/2	B1
	10*d*	2683.51	2683.504	42 237.783	44 921.287	$3s^2(^1S)4d - 3s^2(^1S)7p$	$^2D - ^2P^o$	5/2 – 3/2	B1
	10000	2588.472	2588.476	37 689.407	40 277.883	$3s^2(^1S)5s - 3s^2(^1S)5p$	$^2S - ^2P^o$	1/2 – 3/2	B1
	4000	2582.565	2582.571	37 689.407	40 271.978	$3s^2(^1S)5s - 3s^2(^1S)5p$	$^2S - ^2P^o$	1/2 – 1/2	B1
	4000	2556.354	2556.359	41 319.390	43 875.749	$3s^2(^1S)4f - 3s^2(^1S)5g$	$^2F^o - ^2G$	5/2 – 7/2	B1
			2556.351	41 319.398	43 875.749	$3s^2(^1S)4f - 3s^2(^1S)5g$	$^2F^o - ^2G$	7/2 – 9/2	
	3200	2389.986	2389.977	38 929.413	41 319.390	$3s^2(^1S)nd - 3s^2(^1S)4f$	$y\,^2D - ^2F^o$	3/2 – 5/2	B1
	3200	2389.967							B1
	2000	2385.473	2385.430	38 933.968	41 319.398	$3s^2(^1S)nd - 3s^2(^1S)4f$	$y\,^2D - ^2F^o$	5/2 – 7/2	B1
	2500	2385.446	2385.422	38 933.968	41 319.390	$3s^2(^1S)nd - 3s^2(^1S)4f$	$y\,^2D - ^2F^o$	5/2 – 5/2	B1
	3200	2385.418							B1
	4000	2385.383							B1

Al I – Continued

Mult. No.	Rel. Int.	Wavenumber (cm^{-1}) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
	100*d*	2202.15	2202.170	43 831.101	–	46 033.271	$3s^2(^1S)5f - 3s^2(^1S)7g$	$^2F^o - ^2G$		B1
	130*d*	2161.34	2161.344	43 875.749	–	46 037.093	$3s^2(^1S)5g - 3s^2(^1S)7h$	$^2G - ^2H^o$		B1
	1250	1961.756	1961.764	40 271.978	–	42 233.742	$3s^2(^1S)5p - 3s^2(^1S)4d$	$^2P^o - ^2D$	$1/2 - 3/2$	B1
	1600	1959.932	1959.900	40 277.883	–	42 237.783	$3s^2(^1S)5p - 3s^2(^1S)4d$	$^2P^o - ^2D$	$3/2 - 5/2$	B1
	1400	1959.905								B1
	1250	1959.883								B1
	250	1955.851	1955.859	40 277.883	–	42 233.742	$3s^2(^1S)5p - 3s^2(^1S)4d$	$^2P^o - ^2D$	$3/2 - 3/2$	B1
	500	1872.437	1872.433	40 271.978	–	42 144.411	$3s^2(^1S)5p - 3s^2(^1S)6s$	$^2P^o - ^2S$	$1/2 - 1/2$	B1
	1000	1866.530	1866.528	40 277.883	–	42 144.411	$3s^2(^1S)5p - 3s^2(^1S)6s$	$^2P^o - ^2S$	$3/2 - 1/2$	B1
			918.385	41 319.398	–	42 237.783	$3s^2(^1S)4f - 3s^2(^1S)4d$	$^2F^o - ^2D$	$7/2 - 5/2$	
	2	914.333	914.352	41 319.390	–	42 233.742	$3s^2(^1S)4f - 3s^2(^1S)4d$	$^2F^o - ^2D$	$5/2 - 3/2$	B4
	3	838.565	838.547	45 194.681	–	46 033.228	$3s^2(^1S)6f - 3s^2(^1S)7g$	$^2F - ^2G$		B4
	1	831.374	831.374	43 335.024	–	44 166.398	$3s^2(^1S)6p - 3s^2(^1S)5d$	$^2P^o - ^2D$	$1/2 - 3/2$	B4
	2	830.957	830.958	43 337.889	–	44 168.847	$3s^2(^1S)6p - 3s^2(^1S)5d$	$^2P^o - ^2D$	$3/2 - 5/2$	B4
	4	815.375	815.375	45 221.718	–	46 037.093	$3s^2(^1S)6g - 3s^2(^1S)7h$	$^2G - ^2H$		B4
	6	810.704	810.706	[45 227.552]	–	[46 038.258]	$3s^2(^1S)6h - 3s^2(^1S)7i$	$^2H^o - ^2I$		B4

Al II

Mg I isoelectronic sequence

Ground state $1s^22s^22p^63s^2\ ^1S_0$

Ionization energy 151 862.5 ± 0.4 cm^{-1} (18.828 56 ± 0.000 05 eV)

Kaufman and Hagan [K1] estimate an uncertainty of 0.002 Å for their wavelength measurements in the region below 2100 Å. Many of their values are given here to four decimal places to avoid rounding-off errors [K6]. Some of the higher levels given to one decimal place in MZ79 were listed with two-place values in the later publication [K1]; the differences are only marginally significant, and we have used the MZ79 values for most of these levels.

Kaufman and Hagan measured the spectrum up to 8641 Å but did not observe many of the weaker lines given in earlier references [mainly S2 and P1]. Hyperfine-structure components are listed wherever they were experimentally resolved [S2, P1, K1]; of course the calculated wavelengths do not exhibit these hyperfine splittings. We have also included a number of transitions forbidden by the ΔJ and/or ΔF rules [S2, P1].

Biémont and Brault [B1] recorded the infrared spectrum of an aluminum hollow-cathode discharge using a high-resolution Fourier-transform spectrometer. They adopted the $3s5p\ ^3P^\circ_0$ position from [K1] and, relative to it, reevaluated twelve other levels from $3s5s\ ^3S_1$ to $3s6f\ ^1F^\circ_3$ on the basis of their data. Their level values are given to three decimal places, but it should be noted that seven of these values represent centers-of-gravity of hyperfine structures having spreads up to 0.5 cm^{-1}. We list here the experimental wavenumbers of all the hyperfine components resolved by [B1] for each transition involving one of these levels; the corresponding calculated wavenumber as obtained from the center-of-gravity level positions shoul be appropriate for comparison with lower-resolution ol servations. Biémont and Brault were also able to locat the $3s6h$, $3s7h$, and $3s7i$ terms.

We obtained a value of 151 862.54 ± 0.08 cm^{-1} for th ionization limit relative to the $3s5g-13g$, $6h-9h$, and levels by fitting these levels with appropriate weights to core-polarization formula. This limit agrees with th value 151 862.5 cm^{-1} that Kaufman and Hagan obtaine by fitting the $3sns\ ^3S$ series. Our estimated error (0.4 cm^{-1} includes the uncertainty of the ng, nh, ni hig angular-momentum system of levels relative to th ground level and the uncertainty of the limit relative this ng, nh, ni system.

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Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	2*g*	683.529	683.5274	0.00	146 299.92	$3s^2 - 3s10p$	$^1S - ^1P^o$	0 – 1	K1
	5*g*	689.936	689.9354	0.00	144 941.10	$3s^2 - 3s9p$	$^1S - ^1P^o$	0 – 1	K1
	10*g*	699.489	699.4905	0.00	142 961.20	$3s^2 - 3s8p$	$^1S - ^1P^o$	0 – 1	K1
	20*g*	714.695	714.6993	0.00	139 918.98	$3s^2 - 3s7p$	$^1S - ^1P^o$	0 – 1	K1
	25*g*	741.182	741.1833	0.00	134 919.40	$3s^2 - 3s6p$	$^1S - ^1P^o$	0 – 1	K1
	20*g*	794.475	794.4767	0.00	125 869.015	$3s^2 - 3s5p$	$^1S - ^1P^o$	0 – 1	K1
	20	905.152	905.155	37 577.79	148 056.1	$3s3p - 3s12s$	$^3P^o - ^3S$	2 – 1	K1
	1E2	908.342	908.3491	0.00	110 089.83	$3s^2 - 3s3d$	$^1S - ^1D$	0 – 2	G1
	10	910.916	910.9166	37 453.91	147 233.45	$3s3p - 3s11s$	$^3P^o - ^3S$	1 – 1	K1
	10	911.497	911.4997	37 577.79	147 287.10	$3s3p - 3s10d$	$^3P^o - ^3D$	2 – 3	K1
	40	911.9457	911.9456	37 577.79	147 233.45	$3s3p - 3s11s$	$^3P^o - ^3S$	2 – 1	K6
	30	919.672	919.671	37 453.91	146 188.5	$3s3p - 3s9d$	$^3P^o - ^3D$	1 – 2	K1
	50	920.3166	920.3169	37 453.91	146 112.14	$3s3p - 3s10s$	$^3P^o - ^3S$	1 – 1	K6
	50	920.7160	920.716	37 577.79	146 188.9	$3s3p - 3s9d$	$^3P^o - ^3D$	2 – 3	K6
	75	921.3670	921.3673	37 577.79	146 112.14	$3s3p - 3s10s$	$^3P^o - ^3S$	2 – 1	K6
	20	932.4075	932.410	37 393.03	144 642.0	$3s3p - 3s8d$	$^3P^o - ^3D$	0 – 1	K6
	40	932.9385	932.9379	37 453.91	144 642.18	$3s3p - 3s8d$	$^3P^o - ^3D$	1 – 2	K6
	50	933.4077	933.4077	37 393.03	144 527.35	$3s3p - 3s9s$	$^3P^o - ^3S$	0 – 1	K6
	75	933.9382	933.9384	37 453.91	144 527.35	$3s3p - 3s9s$	$^3P^o - ^3S$	1 – 1	K6
	100	934.0150	934.0150	37 577.79	144 642.45	$3s3p - 3s8d$	$^3P^o - ^3D$	2 – 3	K6
	100	935.0198	935.0202	37 577.79	144 527.35	$3s3p - 3s9s$	$^3P^o - ^3S$	2 – 1	K6
	100*g*	935.2752	935.2738	0.00	106 920.56	$3s^2 - 3s4p$	$^1S - ^1P^o$	0 – 1	K6
	75	952.6301	952.6304	37 393.03	142 365.54	$3s3p - 3s7d$	$^3P^o - ^3D$	0 – 1	K6
	100	953.1822	953.1818	37 453.91	142 365.69	$3s3p - 3s7d$	$^3P^o - ^3D$	1 – 2	K6
	125	954.3050	954.3060	37 577.79	142 365.98	$3s3p - 3s7d$	$^3P^o - ^3D$	2 – 3	K6
	100	954.8466	954.8451	37 453.91	142 182.94	$3s3p - 3s8s$	$^3P^o - ^3S$	1 – 1	K6
	125	955.9766	955.9759	37 577.79	142 182.94	$3s3p - 3s8s$	$^3P^o - ^3S$	2 – 1	K6
	100	985.9802	985.9809	37 393.03	138 814.87	$3s3p - 3s6d$	$^3P^o - ^3D$	0 – 1	K6
	125	986.5712	986.5731	37 453.91	138 814.87	$3s3p - 3s6d$	$^3P^o - ^3D$	1 – 2	K6
	150	987.7772	987.7779	37 577.79	138 815.12	$3s3p - 3s6d$	$^3P^o - ^3D$	2 – 3	K6
	75	989.0525	989.0526	37 393.03	138 499.89	$3s3p - 3s7s$	$^3P^o - ^3S$	0 – 1	K6
	100	989.6475	989.6485	37 453.91	138 499.89	$3s3p - 3s7s$	$^3P^o - ^3S$	1 – 1	K6
	125	990.8623	990.8632	37 577.79	138 499.89	$3s3p - 3s7s$	$^3P^o - ^3S$	2 – 1	K6
	150	1047.8893	1047.8894	37 393.03	132 822.95	$3s3p - 3s5d$	$^3P^o - ^3D$	0 – 1	K6
	170	1048.5588	1048.5600	37 453.91	132 822.80	$3s3p - 3s5d$	$^3P^o - ^3D$	1 – 2	K6
	190	1049.9233	1049.9228	37 577.79	132 822.89	$3s3p - 3s5d$	$^3P^o - ^3D$	2 – 3	K6
	100	1054.6031	1054.6022	37 393.03	132 215.517	$3s3p - 3s6s$	$^3P^o - ^3S$	0 – 1	K6
	125	1055.2802	1055.2798	37 453.91	132 215.517	$3s3p - 3s6s$	$^3P^o - ^3S$	1 – 1	K6
	150	1056.6613	1056.6611	37 577.79	132 215.517	$3s3p - 3s6s$	$^3P^o - ^3S$	2 – 1	K6
	35	1132.726	1132.720	59 852.02	148 135.13	$3s3p - 3s11d$	$^1P^o - ^1D$	1 – 2	K6
	100	1142.9529	1142.9503	59 852.02	147 344.89	$3s3p - 3s10d$	$^1P^o - ^1D$	1 – 2	K6
	125	1157.0881	1157.086	59 852.02	146 276.0	$3s3p - 3s9d$	$^1P^o - ^1D$	1 – 2	K6
	100	1158.2103	1158.211	59 852.02	146 192.1	$3s3p - 3s10s$	$^1P^o - ^1S$	1 – 0	K6
	3E2	1169.860	1169.8458	0.00	85 481.35	$3s^2 - 3p^2$	$^1S - ^1D$	0 – 2	G1
	125	1177.4371	1177.4373	59 852.02	144 782.23	$3s3p - 3s8d$	$^1P^o - ^1D$	1 – 2	K6
	125	1179.3541	1179.3549	59 852.02	144 644.14	$3s3p - 3s9s$	$^1P^o - ^1S$	1 – 0	K6
	125	1189.1854	1189.1848	37 393.03	121 484.252	$3s3p - 3s4d$	$^3P^o - ^3D$	0 – 1	K6
	150	1190.0518	1190.0510	37 453.91	121 483.92	$3s3p - 3s4d$	$^3P^o - ^3D$	1 – 2	K6
	190	1191.8111	1191.8140	37 577.79	121 483.50	$3s3p - 3s4d$	$^3P^o - ^3D$	2 – 3	K6
	150	1208.3522	1208.3533	59 852.02	142 609.27	$3s3p - 3s7d$	$^1P^o - ^1D$	1 – 2	K6
	100	1209.1014	1209.1016	37 393.03	120 092.919	$3s3p - 3s5s$	$^3P^o - ^3S$	0 – 1	K6
	125	1210.0817	1210.0824	37 453.91	120 092.919	$3s3p - 3s5s$	$^3P^o - ^3S$	1 – 1	K6
	150	1211.8983	1211.8991	37 577.79	120 092.919	$3s3p - 3s5s$	$^3P^o - ^3S$	2 – 1	K6
	125	1211.953	1211.959	59 852.02	142 363.06	$3s3p - 3s8s$	$^1P^o - ^1S$	1 – 0	K6
	125	1258.8585	1258.8572	59 852.02	139 289.15	$3s3p - 3s6d$	$^1P^o - ^1D$	1 – 2	K6

Al II — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
	150	1266.6481	1266.6472	59 852.02	–	138 800.60	3s3p – 3s7s	$^1P^o - ^1S$	1 – 0	K6
	150	1350.1782	1350.1774	59 852.02	–	133 916.368	3s3p – 3s5d	$^1P^o - ^1D$	1 – 2	K6
	150	1371.2401	1371.2416	59 852.02	–	132 778.633	3s3p – 3s6s	$^1P^o - ^1S$	1 – 0	K6
UV10	340	1539.8303	1539.8329	59 852.02	–	124 794.13	3s3p – 3s4d	$^1P^o - ^1D$	1 – 2	K6
	1	1555.943	1555.940	85 481.35	–	149 751.2	$3p^2$ – 3s16p	$^1D - ^1P^o$	2 – 1	K1
	1	1563.580	1563.5794	85 481.35	–	149 437.17	$3p^2$ – 3s15p	$^1D - ^1P^o$	2 – 1	K1
	3	1573.003	1573.0040	85 481.35	–	149 053.98	$3p^2$ – 3s14p	$^1D - ^1P^o$	2 – 1	K1
	1	1580.919	1580.9199	85 481.35	–	148 735.66	$3p^2$ – 3s12f	$^1D - ^1F^o$	2 – 3	K1
	4	1584.708	1584.7085	85 481.35	–	148 584.44	$3p^2$ – 3s13p	$^1D - ^1P^o$	2 – 1	K1
	112	1596.059	1596.053	85 481.35	–	148 135.9	$3p^2$ – 3s11f	$^1D - ^1F^o$	2 – 3	K6
	20	1599.410	1599.4078	85 481.35	–	148 004.49	$3p^2$ – 3s12p	$^1D - ^1P^o$	2 – 1	K1
	10	1616.415	1616.4145	85 481.35	–	147 346.67	$3p^2$ – 3s10f	$^1D - ^1F^o$	2 – 3	K1
	50	1618.3990	1618.3987	85 481.35	–	147 270.82	$3p^2$ – 3s11p	$^1D - ^1P^o$	2 – 1	K6
UV9	125	1625.6271	1625.6277	59 852.02	–	121 366.725	3s3p – 3s5s	$^1P^o - ^1S$	1 – 0	K6
	100	1644.2348	1644.2346	85 481.35	–	146 299.92	$3p^2$ – 3s10p	$^1D - ^1P^o$	2 – 1	K6
	100	1644.8089	1644.8085	85 481.35	–	146 278.70	$3p^2$ – 3s9f	$^1D - ^1F^o$	2 – 3	K6
UV2	400g	1670.7867	1670.7874	0.00	–	59 852.02	$3s^2$ – 3s3p	$^1S - ^1P^o$	0 – 1	K6
	80	1681.8089	1681.8100	85 481.35	–	144 941.10	$3p^2$ – 3s9p	$^1D - ^1P^o$	2 – 1	K6
	100	1686.2505	1686.2525	85 481.35	–	144 784.45	$3p^2$ – 3s8f	$^1D - ^1F^o$	2 – 3	K6
UV6	340	1719.4400	1719.4418	37 393.03	–	95 551.44	3s3p – 3s3d	$^3P^o - ^3D$	0 – 1	K6
UV6	255	1721.2435	1721.2436	37 453.91	–	95 551.44	3s3p – 3s3d	$^3P^o - ^3D$	1 – 1	K6
UV6	365	1721.2714	1721.2711	37 453.91	–	95 550.51	3s3p – 3s3d	$^3P^o - ^3D$	1 – 2	K6
UV6	255	1724.9519	1724.9493	37 577.79	–	95 550.51	3s3p – 3s3d	$^3P^o - ^3D$	2 – 2	K6
UV6	365	1724.9838	1724.9817	37 577.79	–	95 549.42	3s3p – 3s3d	$^3P^o - ^3D$	2 – 3	K6
	50	1739.7382	1739.7401	85 481.35	–	142 961.20	$3p^2$ – 3s8p	$^1D - ^1P^o$	2 – 1	K6
	60	1750.612	1750.617	85 481.35	–	142 604.05	$3p^2$ – 3s7f	$^1D - ^1F^o$	2 – 3	K6
UV5	210	1760.1044	1760.1057	37 453.91	–	94 268.68	3s3p – $3p^2$	$^3P^o - ^3P$	1 – 2	K6
UV5	190	1761.9751	1761.9770	37 393.03	–	94 147.46	3s3p – $3p^2$	$^3P^o - ^3P$	0 – 1	K6
UV5	255	1763.8692	1763.8691	37 453.91	–	94 147.46	3s3p – $3p^2$	$^3P^o - ^3P$	1 – 1	K6
UV5	315	1763.9521	1763.9518	37 577.79	–	94 268.68	3s3p – $3p^2$	$^3P^o - ^3P$	2 – 2	K6
UV5	190	1765.8150	1765.8157	37 453.91	–	94 084.96	3s3p – $3p^2$	$^3P^o - ^3P$	1 – 0	K6
UV5	225	1767.7308	1767.7317	37 577.79	–	94 147.46	3s3p – $3p^2$	$^3P^o - ^3P$	2 – 1	K6
	10	1772.802	1772.8032	94 084.96	–	150 492.80	$3p^2$ – 3p3d	$^3P - ^3D^o$	0 – 1	K1
	25	1774.002	1774.0024	94 147.46	–	150 517.17	$3p^2$ – 3p3d	$^3P - ^3D^o$	1 – 2	K1
	10	1774.770	1774.7697	94 147.46	–	150 492.80	$3p^2$ – 3p3d	$^3P - ^3D^o$	1 – 1	K1
	10	1776.19	1776.202	91 274.50	–	147 574.4	3s4s – 3s11p	$^3S - ^3P^o$	1 – 2	J1
	100	1776.975	1776.9725	94 268.68	–	150 544.17	$3p^2$ – 3p3d	$^3P - ^3D^o$	2 – 3	K1
	3	1777.825	1777.8255	94 268.68	–	150 517.17	$3p^2$ – 3p3d	$^3P - ^3D^o$	2 – 2	K1
	70	1807.4168	1807.4162	91 274.50	–	146 602.10	3s4s – 3s10p	$^3S - ^3P^o$	1 – 2	K6
	20	1807.5851	1807.5844	91 274.50	–	146 596.95	3s4s – 3s10p	$^3S - ^3P^o$	1 – 1	K6
	1	1807.651	1807.6531	91 274.50	–	146 594.85	3s4s – 3s10p	$^3S - ^3P^o$	1 – 0	K1
	50	1818.352	1818.3554	95 549.42	–	150 544.17	3s3d – 3p3d	$^3D - ^3D^o$	3 – 3	K1
	3	1818.392	1818.3914	95 550.51	–	150 544.17	3s3d – 3p3d	$^3D - ^3D^o$	2 – 3	K1
	1	1819.285	1819.2846	95 550.51	–	150 517.17	3s3d – 3p3d	$^3D - ^3D^o$	2 – 2	K1
	2	1820.124	1820.1224	95 551.44	–	150 492.80	3s3d – 3p3d	$^3D - ^3D^o$	1 – 1	K1
	290	1828.5876	1828.5868	91 274.50	–	145 961.54	3s4s – 3p4s	$^3S - ^3P^o$	1 – 2	K6
	225	1832.8374	1832.8379	91 274.50	–	145 834.70	3s4s – 3p4s	$^3S - ^3P^o$	1 – 1	K6
	170	1834.8077	1834.8068	91 274.50	–	145 776.15	3s4s – 3p4s	$^3S - ^3P^o$	1 – 0	K6
	60	1836.9635	1836.9646	85 481.35	–	139 918.98	$3p^2$ – 3s7p	$^1D - ^1P^o$	2 – 1	K6
	2	1839.39	1839.392	95 550.51	–	149 916.3	3s3d – 3s15f	$^3D - ^3F^o$	2 – 3	J1
	1	1848.888	1848.8878	95 350.60	–	149 437.17	3s4s – 3s15p	$^1S - ^1P^o$	0 – 1	K1
	2	1849.15	1849.164	95 550.51	–	149 629.0	3s3d – 3s14f	$^3D - ^3F^o$	2 – 3	J1
	90	1855.8054	1855.8044	91 274.50	–	145 159.49	3s4s – 3s9p	$^3S - ^3P^o$	1 – 2	K6
UV4	190	1855.9286	1855.9256	37 393.03	–	91 274.50	3s3p – 3s4s	$^3P^o - ^3S$	0 – 1	K6
	90	1856.0957	1856.0947	91 274.50	–	145 151.06	3s4s – 3s9p	$^3S - ^3P^o$	1 – 1	K6

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm⁻¹) Lower		Upper	Configurations	Terms	J Values	Ref.
	30	1856.2741	1856.2746	91 274.50	–	145 145.84	$3s4s - 3s9p$	$^3S - ^3P^o$	1 – 0	K6
UV4	315	1858.0262	1858.0250	37 453.91	–	91 274.50	$3s3p - 3s4s$	$^3P^o - ^3S$	1 – 1	K6
	110	1859.9796	1859.9810	85 481.35	–	139 245.343	$3p^2 - 3s6f$	$^1D - ^1F^o$	2 – 3	K6
	5	1862.081	1862.0802	95 350.60	–	149 053.98	$3s4s - 3s14p$	$^1S - ^1P^o$	0 – 1	K1
UV4	400	1862.3111	1862.3115	37 577.79	–	91 274.50	$3s3p - 3s4s$	$^3P^o - ^3S$	2 – 1	K6
	5	1877.04	1877.046	95 550.51	–	148 825.7	$3s3d - 3s12f$	$^3D - ^3F^o$	2 – 3	J1
	8	1878.504	1878.5043	95 350.60	–	148 584.44	$3s4s - 3s13p$	$^1S - ^1P^o$	0 – 1	K1
	10	1897.401	1897.4014	95 549.42	–	148 253.08	$3s3d - 3s11f$	$^3D - ^3F^o$	3 – 4	K1
	3	1897.460	1897.4608	95 550.51	–	148 252.52	$3s3d - 3s11f$	$^3D - ^3F^o$	2 – 3	K1
	1	1897.500	1897.4997	95 551.44	–	148 252.37	$3s3d - 3s11f$	$^3D - ^3F^o$	1 – 2	K1
	25	1899.1943	1899.1949	95 350.60	–	148 004.49	$3s4s - 3s12p$	$^1S - ^1P^o$	0 – 1	K6
	8	1904.326	1904.3270	94 084.96	–	146 596.95	$3p^2 - 3s10p$	$^3P - ^3P^o$	0 – 1	K1
	25	1906.4082	1906.4090	94 147.46	–	146 602.10	$3p^2 - 3s10p$	$^3P - ^3P^o$	1 – 2	K6
	4	1906.596	1906.5962	94 147.46	–	146 596.95	$3p^2 - 3s10p$	$^3P - ^3P^o$	1 – 1	K1
	8	1906.674	1906.6726	94 147.46	–	146 594.85	$3p^2 - 3s10p$	$^3P - ^3P^o$	1 – 0	K1
	80	1910.8252	1910.8249	94 268.68	–	146 602.10	$3p^2 - 3s10p$	$^3P - ^3P^o$	2 – 2	K6
	15	1911.013	1911.0129	94 268.68	–	146 596.95	$3p^2 - 3s10p$	$^3P - ^3P^o$	2 – 1	K1
	1	1922.16	1922.154	95 549.42	–	147 574.4	$3s3d - 3s11p$	$^3D - ^3P^o$	3 – 2	J1
	50	1924.7537	1924.7537	95 549.42	–	147 504.12	$3s3d - 3s10f$	$^3D - ^3F^o$	3 – 4	K6
	30	1924.825	1924.8256	95 550.51	–	147 503.27	$3s3d - 3s10f$	$^3D - ^3F^o$	2 – 3	K1
	10	1924.879	1924.8789	95 551.44	–	147 502.76	$3s3d - 3s10f$	$^3D - ^3F^o$	1 – 2	K1
	60	1926.0291	1926.0319	95 350.60	–	147 270.82	$3s4s - 3s11p$	$^1S - ^1P^o$	0 – 1	K6
	20	1926.948	1926.9479	91 274.50	–	143 170.04	$3s4s - 3s8p$	$^3S - ^3P^o$	1 – 2	K1
	10	1927.070	1927.0697	91 274.50	–	143 166.76	$3s4s - 3s8p$	$^3S - ^3P^o$	1 – 1	K1
	1	1927.13	1927.120	91 274.50	–	143 165.4	$3s4s - 3s8p$	$^3S - ^3P^o$	1 – 0	J1
	150	1929.9775	1929.9773	94 147.46	–	145 961.54	$3p^2 - 3p4s$	$^3P - ^3P^o$	1 – 2	K6
	125	1931.0481	1931.0496	59 852.02	–	111 637.33	$3s3p - 3p^2$	$^1P^o - ^1S$	1 – 0	K6
	150	1932.3768	1932.3760	94 084.96	–	145 834.70	$3p^2 - 3p4s$	$^3P - ^3P^o$	0 – 1	K6
	225	1934.5032	1934.5031	94 268.68	–	145 961.54	$3p^2 - 3p4s$	$^3P - ^3P^o$	2 – 2	K6
	125	1934.7129	1934.7135	94 147.46	–	145 834.70	$3p^2 - 3p4s$	$^3P - ^3P^o$	1 – 1	K6
	125	1936.9066	1936.9076	94 147.46	–	145 776.15	$3p^2 - 3p4s$	$^3P - ^3P^o$	1 – 0	K6
	150	1939.2606	1939.2616	94 268.68	–	145 834.70	$3p^2 - 3p4s$	$^3P - ^3P^o$	2 – 1	K6
	8	1958.247	1958.2463	94 084.96	–	145 151.06	$3p^2 - 3s9p$	$^3P - ^3P^o$	0 – 1	K1
	1	1958.77	1958.7610	95 549.42	–	146 602.10	$3s3d - 3s10p$	$^3D - ^3P^o$	3 – 2	J1
	0	1959.00	1959.0005	95 550.51	–	146 596.95	$3s3d - 3s10p$	$^3D - ^3P^o$	2 – 1	J1
	3	1960.322	1960.3219	94 147.46	–	145 159.49	$3p^2 - 3s9p$	$^3P - ^3P^o$	1 – 2	K1
	3	1960.646	1960.6459	94 147.46	–	145 151.06	$3p^2 - 3s9p$	$^3P - ^3P^o$	1 – 1	K1
	10	1960.846	1960.8466	94 147.46	–	145 145.84	$3p^2 - 3s9p$	$^3P - ^3P^o$	1 – 0	K1
	70	1962.5904	1962.5911	95 549.42	–	146 502.47	$3s3d - 3s9f$	$^3D - ^3F^o$	3 – 4	K6
	8	1962.645	1962.6481	95 549.42	–	146 500.99	$3s3d - 3s9f$	$^3D - ^3F^o$	3 – 3	K1
	60	1962.6910	1962.6900	95 550.51	–	146 500.99	$3s3d - 3s9f$	$^3D - ^3F^o$	2 – 3	K6
	70	1962.7349	1962.7347	95 350.60	–	146 299.92	$3s4s - 3s10p$	$^1S - ^1P^o$	0 – 1	K6
	50	1962.763	1962.768	95 551.44	–	146 499.90	$3s3d - 3s9f$	$^3D - ^3F^o$	1 – 2	K6
	40	1964.990	1964.9913	94 268.68	–	145 159.49	$3p^2 - 3s9p$	$^3P - ^3P^o$	2 – 2	K1
	10	1965.316	1965.3109	94 268.68	–	145 151.06	$3p^2 - 3s9p$	$^3P - ^3P^o$	2 – 1	K1
	10	1983.650	1983.6500	95 549.42	–	145 961.54	$3s3d - 3p4s$	$^3D - ^3P^o$	3 – 2	K1
	3	1988.699	1988.6966	95 550.51	–	145 834.70	$3s3d - 3p4s$	$^3D - ^3P^o$	2 – 1	K1
UV8	315	1990.5310	1990.5326	59 852.02	–	110 089.83	$3s3p - 3s3d$	$^1P^o - ^1D$	1 – 2	K6
	1	1991.05	1991.0518	95 551.44	–	145 776.15	$3s3d - 3p4s$	$^3D - ^3P^o$	1 – 0	J1
		Air Wavelength (Å)								
	70	2015.864	2015.864	95 350.60	–	144 941.10	$3s4s - 3s9p$	$^1S - ^1P^o$	0 – 1	K1

Al II — Continued

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	150	2016.053	2016.052	95 549.42	145 135.31	$3s3d - 3s8f$	$^3D - ^3F^o$	3 – 4	K1
	80	2016.193	2016.189	95 549.42	145 131.93	$3s3d - 3s8f$	$^3D - ^3F^o$	3 – 3	K1
	150	2016.234	2016.234	95 550.51	145 131.93	$3s3d - 3s8f$	$^3D - ^3F^o$	2 – 3	K1
	50	2016.334	2016.332	95 550.51	145 129.51	$3s3d - 3s8f$	$^3D - ^3F^o$	2 – 2	K1
	100	2016.369	2016.370	95 551.44	145 129.51	$3s3d - 3s8f$	$^3D - ^3F^o$	1 – 2	K1
	40	2022.081	2022.082	85 481.35	134 919.40	$3p^2 - 3s6p$	$^1D - ^1P^o$	2 – 1	K1
	1	2036.75	2036.760	94 084.96	143 166.76	$3p^2 - 3s8p$	$^3P - ^3P^o$	0 – 1	J1
	1	2039.22	2039.221	94 147.46	143 170.04	$3p^2 - 3s8p$	$^3P - ^3P^o$	1 – 2	J1
	5	2039.40	2039.41	94 147.46	143 165.4	$3p^2 - 3s8p$	$^3P - ^3P^o$	1 – 0	J1
	2	2044.27	2044.277	94 268.68	143 170.04	$3p^2 - 3s8p$	$^3P - ^3P^o$	2 – 2	J1
	1	2044.41	2044.414	94 268.68	143 166.76	$3p^2 - 3s8p$	$^3P - ^3P^o$	2 – 1	J1
	5	2047.63	2047.63	91 274.50	140 095.7	$3s4s - 3s7p$	$^3S - ^3P^o$	1 – 2	J1
	5	2047.79	2047.79	91 274.50	140 091.9	$3s4s - 3s7p$	$^3S - ^3P^o$	1 – 1	J1
	1	2047.87	2047.87	91 274.50	140 090.0	$3s4s - 3s7p$	$^3S - ^3P^o$	1 – 0	J1
	200	2074.009	2074.009	85 481.35	133 681.78	$3p^2 - 3s5f$	$^1D - ^1F^o$	2 – 3	K1
UV3	15	2081.481	2081.480	37 453.91	85 481.35	$3s3p - 3p^2$	$^3P^o - ^1D$	1 – 2	K1
UV3	30	2086.864	2086.864	37 577.79	85 481.35	$3s3p - 3p^2$	$^3P^o - ^1D$	2 – 2	K1
	700	2094.264	2094.263	95 549.42	143 283.75	$3s3d - 3s7f$	$^3D - ^3F^o$	3 – 4	K1
	150	2094.744	2094.741	95 549.42	143 272.86	$3s3d - 3s7f$	$^3D - ^3F^o$	3 – 3	K1
	300	2094.790	2094.789	95 550.51	143 272.86	$3s3d - 3s7f$	$^3D - ^3F^o$	2 – 3	K1
	100	2095.100	2095.097	95 550.51	143 265.83	$3s3d - 3s7f$	$^3D - ^3F^o$	2 – 2	K1
	200	2095.140	2095.138	95 551.44	143 265.83	$3s3d - 3s7f$	$^3D - ^3F^o$	1 – 2	K1
	80	2099.709	2099.706	95 350.60	142 961.20	$3s4s - 3s8p$	$^1S - ^1P^o$	0 – 1	K1
	500	2192.604	2192.601	95 549.42	141 143.1	$3s3d - 3p3d$	$^3D - ^3F^o$	3 – 4	K1
	20	2194.189	2194.189	95 549.42	141 110.1	$3s3d - 3p3d$	$^3D - ^3F^o$	3 – 3	K1
	70	2194.245	2194.242	95 550.51	141 110.1	$3s3d - 3p3d$	$^3D - ^3F^o$	2 – 3	K1
	300	2195.456	2195.456	95 550.51	141 084.9	$3s3d - 3p3d$	$^3D - ^3F^o$	2 – 2	K1
	300	2195.502	2195.501	95 551.44	141 084.9	$3s3d - 3p3d$	$^3D - ^3F^o$	1 – 2	K1
	300	2243.045	2243.047	95 350.60	139 918.98	$3s4s - 3s7p$	$^1S - ^1P^o$	0 – 1	K1
	50	2285.126	2285.133	91 274.50	135 022.127	$3s4s - 3s6p$	$^3S - ^3P^o$	1 – 2	K1
	10	2285.470	2285.469	91 274.50	135 015.701	$3s4s - 3s6p$	$^3S - ^3P^o$	1 – 1	K1
	5	2285.69	2285.65	91 274.50	135 012.285	$3s4s - 3s6p$	$^3S - ^3P^o$	1 – 0	S2
	1	2312.225	2312.192	105 441.50	148 677.2	$3s4p - 3s13s$	$^3P^o - ^3S$	1 – 1	S2
	100	2313.768	2313.768	105 470.93	148 677.2	$3s4p - 3s13s$	$^3P^o - ^3S$	2 – 1	K1
	350	2324.199	2324.198	95 549.42	138 561.8	$3s3d - 3s6f$	$^3D - ^3F^o$	3 – 4	K1
	10	2325.436	2325.437	95 549.42	138 538.9	$3s3d - 3s6f$	$^3D - ^3F^o$	3 – 3	K1
	300	2325.494	2325.496	95 550.51	138 538.9	$3s3d - 3s6f$	$^3D - ^3F^o$	2 – 3	K1
	10	2326.445	2326.443	95 550.51	138 521.4	$3s3d - 3s6f$	$^3D - ^3F^o$	2 – 2	K1
	300	2326.496	2326.493	95 551.44	138 521.4	$3s3d - 3s6f$	$^3D - ^3F^o$	1 – 2	K1
	3	2328.20	2328.20	106 920.56	149 859.0	$3s4p - 3s16s$	$^1P^o - ^1S$	1 – 0	S2
	7	2344.69	2344.69	106 920.56	149 557.1	$3s4p - 3s15s$	$^1P^o - ^1S$	1 – 0	S2
	3	2345.47	2345.47	105 470.93	148 093.2	$3s4p - 3s11d$	$^3P^o - ^3D$	2 – 3	S2
	3	2345.92	2345.90	105 441.50	148 056.1	$3s4p - 3s12s$	$^3P^o - ^3S$	1 – 1	S2
	30	2347.516	2347.517	105 470.93	148 056.1	$3s4p - 3s12s$	$^3P^o - ^3S$	2 – 1	K1
	10	2365.460	2365.489	106 920.56	149 182.2	$3s4p - 3s14s$	$^1P^o - ^1S$	1 – 0	S2
	5	2389.035	2389.032	105 441.50	147 286.7	$3s4p - 3s10d$	$^3P^o - ^3D$	1 – 2	K1
	25	2390.692	2390.691	105 470.93	147 287.10	$3s4p - 3s10d$	$^3P^o - ^3D$	2 – 3	K1
	15	2391.276	2391.277	105 427.52	147 233.45	$3s4p - 3s11s$	$^3P^o - ^3S$	0 – 1	K1
	50	2392.078	2392.076	105 441.50	147 233.45	$3s4p - 3s11s$	$^3P^o - ^3S$	1 – 1	K1
	10	2392.234	2392.232	106 920.56	148 709.8	$3s4p - 3s13s$	$^1P^o - ^1S$	1 – 0	K1
	100	2393.760	2393.762	105 470.93	147 233.45	$3s4p - 3s11s$	$^3P^o - ^3S$	2 – 1	K1
	5	2425.596	2425.590	106 920.56	148 135.13	$3s4p - 3s11d$	$^1P^o - ^1D$	1 – 2	K1
	50	2427.742	2427.742	106 920.56	148 098.6	$3s4p - 3s12s$	$^1P^o - ^1S$	1 – 0	K1
	30	2452.584	2452.584	105 427.52	146 188.5	$3s4p - 3s9d$	$^3P^o - ^3D$	0 – 1	K1
	100	2453.423	2453.426	105 441.50	146 188.5	$3s4p - 3s9d$	$^3P^o - ^3D$	1 – 2	K1

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	*J* Values	Ref.
	200	2455.177	2455.175	105 470.93	–	146 188.9	3s4p – 3s9d	^{3}P° – ^{3}D	2 – 3	K1
	100	2457.187	2457.188	105 427.52	–	146 112.14	3s4p – 3s10s	^{3}P° – ^{3}S	0 – 1	K1
	300	2458.037	2458.032	105 441.50	–	146 112.14	3s4p – 3s10s	^{3}P° – ^{3}S	1 – 1	K1
	3	2458.88	2458.88	110 089.83	–	150 746.4	3s3d – 3s20f	^{1}D – ^{1}F°	2 – 3	S2
	500	2459.809	2459.812	105 470.93	–	146 112.14	3s4p – 3s10s	^{3}P° – ^{3}S	2 – 1	K1
	3	2466.28	2466.28	110 089.83	–	150 624.5	3s3d – 3s19f	^{1}D – ^{1}F°	2 – 3	S2
	25	2473.008	2473.010	106 920.56	–	147 344.89	3s4p – 3s10d	^{1}P° – ^{11}	1 – 2	K1
UV12	1500	2475.252	2475.256	85 481.35	–	125 869.015	3p^2 – 3s5p	^{1}D – ^{1}P°	2 – 1	K1
	300	2476.322	2476.313	106 920.56	–	147 290.98	3s4p – 3s11s	^{1}P° – ^{1}S	1 – 0	K1
	5	2485.35	2485.354	110 089.83	–	150 313.4	3s3d – 3s17f	^{1}D – ^{1}F°	2 – 3	S2
	10	2497.886	2497.887	110 089.83	–	150 111.6	3s3d – 3s16f	^{1}D – ^{1}F°	2 – 3	K1
	5	2504.25	2504.25	110 089.83	–	150 009.9	3s3d – 3s17p	^{1}D – ^{1}P°	2 – 1	S2
	20	2513.145	2513.147	110 089.83	–	149 868.6	3s3d – 3s15f	^{1}D – ^{1}F°	2 – 3	K1
	45	2520.579	2520.587	110 089.83	–	149 751.2	3s3d – 3s16p	^{1}D – ^{1}P°	2 – 1	K1
	1000	2526.486	2526.484	95 350.60	–	134 919.40	3s4s – 3s6p	^{1}S – ^{1}P°	0 – 1	K1
	50	2532.092	2532.092	110 089.83	–	149 571.0	3s3d – 3s14f	^{1}D – ^{1}F°	2 – 3	K1
UV15	300	2532.629	2532.635	95 549.42	–	135 022.127	3s3d – 3s6p	^{3}D – ^{3}P°	3 – 2	K1
UV15	5	2533.117	2533.117	95 550.51	–	135 015.701	3s3d – 3s6p	^{3}D – ^{3}P°	2 – 1	K1
UV15	45	2533.170	2533.177	95 551.44	–	135 015.701	3s3d – 3s6p	^{3}D – ^{3}P°	1 – 1	K1
	150	2540.179	2540.182	106 920.56	–	146 276.0	3s4p – 3s9d	^{1}P° – ^{1}D	1 – 2	K1
	100	2540.706	2540.705	110 089.83	–	149 437.17	3s3d – 3s15p	^{1}D – ^{1}P°	2 – 1	K1
	450	2545.606	2545.609	106 920.56	–	146 192.1	3s4p – 3s10s	^{1}P° – ^{1}S	1 – 0	K1
	150	2549.314	2549.313	105 427.52	–	144 642.0	3s4p – 3s8d	^{3}P° – ^{3}D	0 – 1	K1
	450	2550.217	2550.211	105 441.50	–	144 642.18	3s4p – 3s8d	^{3}P° – ^{3}D	1 – 2	K1
	500	2552.109	2552.109	105 470.93	–	144 642.45	3s4p – 3s8d	^{3}P° – ^{3}D	2 – 3	K1
	50	2556.007	2556.008	110 089.83	–	149 201.6	3s3d – 3s13f	^{1}D – ^{1}F°	2 – 3	K1
	300	2556.793	2556.789	105 427.52	–	144 527.35	3s4p – 3s9s	^{3}P° – ^{3}S	0 – 1	K1
	500	2557.707	2557.704	105 441.50	–	144 527.35	3s4p – 3s9s	^{3}P° – ^{3}S	1 – 1	K1
	1000	2559.627	2559.631	105 470.93	–	144 527.35	3s4p – 3s9s	^{3}P° – ^{3}S	2 – 1	K1
	150	2565.694	2565.693	110 089.83	–	149 053.98	3s3d – 3s14p	^{1}D – ^{1}P°	2 – 1	K1
	150	2586.829	2586.827	110 089.83	–	148 735.66	3s3d – 3s12f	^{1}D – ^{1}F°	2 – 3	K1
	300	2596.992	2596.990	110 089.83	–	148 584.44	3s3d – 3s13p	^{1}D – ^{1}P°	2 – 1	K1
	15	2622.926	2622.934	111 637.33	–	149 751.2	3p^2 – 3s16p	^{1}S – ^{1}P°	0 – 1	K1
	350	2627.597	2627.609	110 089.83	–	148 135.9	3s3d – 3s11f	^{1}D – ^{1}F°	2 – 3	K1
UV11	100	2631.546	2631.546	85 481.35	–	123 470.5	3p^2 – 3s4f	^{1}D – ^{1}F°	2 – 3	K1
	250	2635.020	2635.018	85 481.35	–	123 420.45	3p^2 – 3s4f	^{1}D – ^{3}F°	2 – 3	K1
	500	2636.724	2636.716	110 089.83	–	148 004.49	3s3d – 3s12p	^{1}D – ^{1}P°	2 – 1	K1
UV14	3000	2637.689	2637.691	95 549.42	–	133 450.07	3s3d – 3s5f	^{3}D – ^{3}F°	3 – 4	K1
UV14	1000	2638.178	2638.178	95 549.42	–	133 443.08	3s3d – 3s5f	^{3}D – ^{3}F°	3 – 3	K1
UV14	2500	2638.255	2638.254	95 550.51	–	133 443.08	3s3d – 3s5f	^{3}D – ^{3}F°	2 – 3	K1
UV14	500	2638.627	2638.627	95 550.51	–	133 437.71	3s3d – 3s5f	^{3}D – ^{3}F°	2 – 2	K1
UV14	2000	2638.690	2638.692	95 551.44	–	133 437.71	3s3d – 3s5f	^{3}D – ^{3}F°	1 – 2	K1
	450	2640.408	2640.407	106 920.56	–	144 782.23	3s4p – 3s8d	^{1}P° – ^{1}D	1 – 2	K1
	500	2650.073	2650.073	106 920.56	–	144 644.14	3s4p – 3s9s	^{1}P° – ^{1}S	1 – 0	K1
UV1	2500*g*	2669.157	2669.155	0.00	–	37 453.91	3s^2 – 3s3p	^{1}S – ^{3}P°	0 – 1	K1
	45	2671.811	2671.813	111 637.33	–	149 053.98	3p^2 – 3s14p	^{1}S – ^{1}P°	0 – 1	K1
	500	2683.274	2683.274	110 089.83	–	147 346.67	3s3d – 3s10f	^{1}D – ^{1}F°	2 – 3	K1
	500	2688.743	2688.748	110 089.83	–	147 270.82	3s3d – 3s11p	^{1}D – ^{1}P°	2 – 1	K1
	50	2705.770	2705.769	111 637.33	–	148 584.44	3p^2 – 3s13p	^{1}S – ^{1}P°	0 – 1	K1
	300	2706.435	2706.435	105 427.52	–	142 365.54	3s4p – 3s7d	^{3}P° – ^{3}D	0 – 1	K1
	500	2707.452	2707.449	105 441.50	–	142 365.69	3s4p – 3s7d	^{3}P° – ^{3}D	1 – 2	K1
	1000	2709.593	2709.587	105 470.93	–	142 365.98	3s4p – 3s7d	^{3}P° – ^{3}D	2 – 3	K1
	350	2719.884	2719.881	105 427.52	–	142 182.94	3s4p – 3s8s	^{3}P° – ^{3}S	0 – 1	K1
	500	2723.098	2723.098	105 470.93	–	142 182.94	3s4p – 3s8s	^{3}P° – ^{3}S	2 – 1	K1
	150	2748.925	2748.921	111 637.33	–	148 004.49	3p^2 – 3s12p	^{1}S – ^{1}P°	0 – 1	K1

Al II – Continued

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	500	2760.844	2760.845	110 089.83	146 299.92	3s3d – 3s10p	$^1D - ^1P^o$	2 – 1	K1
	500	2762.464	2762.464	110 089.83	146 278.70	3s3d – 3s9f	$^1D - ^1F^o$	2 – 3	K1
	500	2801.178	2801.181	106 920.56	142 609.27	3s4p – 3s7d	$^1P^o - ^1D$	1 – 2	K1
	150	2805.518	2805.522	111 637.33	147 270.82	$3p^2$ – 3s11p	$^1S - ^1P^o$	0 – 1	K1
UV7	4000	2816.185	2816.185	59 852.02	95 350.60	3s3p – 3s4s	$^1P^o - ^1S$	1 – 0	K1
	125	2820.646	2820.641	106 920.56	142 363.06	3s4p – 3s8s	$^1P^o - ^1S$	1 – 0	K1
	1000	2868.494	2868.494	110 089.83	144 941.10	3s3d – 3s9p	$^1D - ^1P^o$	2 – 1	K1
	500	2881.450	2881.446	110 089.83	144 784.45	3s3d – 3s8f	$^1D - ^1F^o$	2 – 3	K1
	10	2884.106	2884.109	111 637.33	146 299.92	$3p^2$ – 3s10p	$^1S - ^1P^o$	0 – 1	K1
UV13		2902.08	2902.143	91 274.50	125 721.703	3s4s – 3s5p	$^3S - ^3P^o$	1 – 2	P1
UV13		2902.08	2902.142	91 274.50	125 703.140	3s4s – 3s5p	$^3S - ^3P^o$	1 – 0	P1
UV13		2903.19	2903.228	91 274.50	125 708.828	3s4s – 3s5p	$^3S - ^3P^o$	1 – 1	P1
14	50	2994.277	2994.273	105 427.52	138 814.87	3s4p – 3s6d	$^3P^o - ^3D$	0 – 1	K1
14	400	2995.525	2995.528	105 441.50	138 814.87	3s4p – 3s6d	$^3P^o - ^3D$	1 – 2	K1
14	500	2998.150	2998.149	105 470.93	138 815.12	3s4p – 3s6d	$^3P^o - ^3D$	2 – 3	K1
	30	3001.790	3001.788	111 637.33	144 941.10	$3p^2$ – 3s9p	$^1S - ^1P^o$	0 – 1	K1
13	15	3022.789	3022.792	105 427.52	138 499.89	3s4p – 3s7s	$^3P^o - ^3S$	0 – 1	K1
13	200	3024.077	3024.070	105 441.50	138 499.89	3s4p – 3s7s	$^3P^o - ^3S$	1 – 1	K1
13	500	3026.761	3026.765	105 470.93	138 499.89	3s4p – 3s7s	$^3P^o - ^3S$	2 – 1	K1
28	750	3041.276	3041.276	110 089.83	142 961.20	3s3d – 3s8p	$^1D - ^1P^o$	2 – 1	K1
27	750	3074.691	3074.684	110 089.83	142 604.05	3s3d – 3s7f	$^1D - ^1F^o$	2 – 3	K1
20	800	3088.516	3088.518	106 920.56	139 289.15	3s4p – 3s6d	$^1P^o - ^1D$	1 – 2	K1
19	75	3135.848	3135.850	106 920.56	138 800.60	3s4p – 3s7s	$^1P^o - ^1S$	1 – 0	K1
	2	3191.529	3191.531	111 637.33	142 961.20	$3p^2$ – 3s8p	$^1S - ^1P^o$	0 – 1	K1
5	80	3275.767	3275.766	95 350.60	125 869.015	3s4s – 3s5p	$^1S - ^1P^o$	0 – 1	K1
8	80	3313.344	3313.346	95 549.42	125 721.703	3s3d – 3s5p	$^3D - ^3P^o$	3 – 2	P1
8	2	3313.470	3313.466	95 550.51	125 721.703	3s3d – 3s5p	$^3D - ^3P^o$	2 – 2	P1
8	2	3314.756	3314.761	95 549.42	125 708.828	3s3d – 3s5p	$^3D - ^3P^o$	3 – 1	P1
8	40	3314.883	3314.881	95 550.51	125 708.828	3s3d – 3s5p	$^3D - ^3P^o$	2 – 1	P1
8	1	3314.981	3314.984	95 551.44	125 708.828	3s3d – 3s5p	$^3D - ^3P^o$	1 – 1	P1
8	2	3315.516	3315.506	95 550.51	125 703.140	3s3d – 3s5p	$^3D - ^3P^o$	2 – 0	P1
8	10	3315.608	3315.608	95 551.44	125 703.140	3s3d – 3s5p	$^3D - ^3P^o$	1 – 0	P1
26	50	3351.462	3351.462	110 089.83	139 918.98	3s3d – 3s7p	$^1D - ^1P^o$	2 – 1	K1
25	30	3428.894	3428.900	110 089.83	139 245.343	3s3d – 3s6f	$^1D - ^1F^o$	2 – 3	K1
55	5	3463.63	3463.60	121 483.50	150 346.9	3s4d – 3s17f	$^3D - ^3F^o$	3 – 4	S2
54	2	3516.05	3516.06	121 483.50	149 916.3	3s4d – 3s15f	$^3D - ^3F^o$	3 – 4	S2
	5	3534.856	3534.851	111 637.33	139 918.98	$3p^2$ – 3s7p	$^1S - ^1P^o$	0 – 1	K1
53	3	3552.00	3551.95	121 483.50	149 629.0	3s4d – 3s14f	$^3D - ^3F^o$	3 – 4	S2
7	200	3586.557	3586.557	95 549.42	123 423.36	3s3d – 3s4f	$^3D - ^3F^o$	3 – 4	P1
7	15	3586.708	3586.697	95 550.51	123 423.36	3s3d – 3s4f	$^3D - ^3F^o$	2 – 4	P1
7	2	3586.811	3586.817	95 551.44	123 423.36	3s3d – 3s4f	$^3D - ^3F^o$	1 – 4	P1
7	50	3586.912 }	3586.931	95 549.42	123 420.45	3s3d – 3s4f	$^3D - ^3F^o$	3 – 3	P1
7	25	3586.936 }							P1
7	100	3587.068	3587.072	95 550.51	123 420.45	3s3d – 3s4f	$^3D - ^3F^o$	2 – 3	P1
7	5	3587.165 }	3587.185	95 549.42	123 418.48	3s3d – 3s4f	$^3D - ^3F^o$	3 – 2	P1
7	10	3587.195 }							P1
7	30	3587.309 }	3587.325	95 550.51	123 418.48	3s3d – 3s4f	$^3D - ^3F^o$	2 – 2	P1
7	50	3587.342 }							P1
7	70	3587.450	3587.445	95 551.44	123 418.48	3s3d – 3s4f	$^3D - ^3F^o$	1 – 2	K1
52	4	3597.50	3597.46	121 483.50	149 273.0	3s4d – 3s13f	$^3D - ^3F^o$	3 – 4	S2
12	10	3649.184 }	3649.204	105 427.52	132 822.95	3s4p – 3s5d	$^3P^o - ^3D$	0 – 1	P1
12	5	3649.232 }							P1

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
12	40	3651.065	3651.087	105 441.50	132 822.80	$3s4p - 3s5d$	$^3P^o - ^3D$	1 – 2	P1
12	30	3651.096							P1
12	35	3654.981	3655.004	105 470.93	132 822.89	$3s4p - 3s5d$	$^3P^o - ^3D$	2 – 3	P1
12	50	3654.998							P1
51	2	3656.319	3656.309	121 483.50	148 825.7	$3s4d - 3s12f$	$^3D - ^3F^o$	3 – 4	S2
18	30	3703.219	3703.225	106 920.56	133 916.368	$3s4p - 3s5d$	$^1P^o - ^1D$	1 – 2	K1
11	10	3731.952	3731.954	105 427.52	132 215.517	$3s4p - 3s6s$	$^3P^o - ^3S$	0 – 1	K1
11	20	3733.908	3733.903	105 441.50	132 215.517	$3s4p - 3s6s$	$^3P^o - ^3S$	1 – 1	K1
50	3	3734.567	3734.521	121 483.50	148 253.08	$3s4d - 3s11f$	$^3D - ^3F^o$	3 – 4	S2
50	2	3734.715	3734.658	121 483.92	148 252.52	$3s4d - 3s11f$	$^3D - ^3F^o$	2 – 3	S2
50			3734.726	121 484.252	148 252.37	$3s4d - 3s11f$	$^3D - ^3F^o$	1 – 2	
11	50	3738.015	3738.012	105 470.93	132 215.517	$3s4p - 3s6s$	$^3P^o - ^3S$	2 – 1	K1
39	2	3753.10	3753.001	121 366.725	148 004.49	$3s5s - 3s12p$	$^1S - ^1P^o$	0 – 1	S2
33			3771.205	120 092.919	146 602.10	$3s5s - 3s10p$	$^3S - ^3P^o$	1 – 2	
33			3771.938	120 092.919	146 596.95	$3s5s - 3s10p$	$^3S - ^3P^o$	1 – 1	
33			3772.237	120 092.919	146 594.85	$3s5s - 3s10p$	$^3S - ^3P^o$	1 – 0	
49	6	3842.037	3842.016	121 483.50	147 504.12	$3s4d - 3s10f$	$^3D - ^3F^o$	3 – 4	S2
49	4	3842.213	3842.204	121 483.92	147 503.27	$3s4d - 3s10f$	$^3D - ^3F^o$	2 – 3	S2
49	2	3842.317	3842.328	121 484.25	147 502.76	$3s4d - 3s10f$	$^3D - ^3F^o$	1 – 2	S2
38	6	3859.33	3859.298	121 366.725	147 270.82	$3s5s - 3s11p$	$^1S - ^1P^o$	0 – 1	S2
17	8	3866.160	3866.168	106 920.56	132 778.633	$3s4p - 3s6s$	$^1P^o - ^1S$	1 – 0	K1
74	2	3870.057	3870.050	123 423.36	149 255.5	$3s4f - 3s13g$	$^3F^o - G$	4 –	S2
1	100	3900.675	3900.675	59 852.02	85 481.35	$3s3p - 3p^2$	$^1P^o - ^1D$	1 – 2	K1
73	2*d*	3938.621	3938.631	123 420.45	148 802.8	$3s4f - 3s12g$	$^3F^o - G$	3 –	S2
73	1*d*	3939.066	3939.082	123 423.36	148 802.8	$3s4f - 3s12g$	$^3F^o - G$	4 –	S2
63	2*d*	3946.406	3946.412	123 470.5	148 802.8	$3s4f - 3s12g$	$^1F^o - G$	3 –	S2
48			3979.988	121 483.50	146 602.10	$3s4d - 3s10p$	$^3D - ^3P^o$	3 – 2	
48			3980.871	121 483.92	146 596.95	$3s4d - 3s10p$	$^3D - ^3P^o$	2 – 1	
48			3981.256	121 484.252	146 594.85	$3s4d - 3s10p$	$^3D - ^3P^o$	1 – 0	
32			3988.248	120 092.919	145 159.49	$3s5s - 3s9p$	$^3S - ^3P^o$	1 – 2	
32			3989.589	120 092.919	145 151.06	$3s5s - 3s9p$	$^3S - ^3P^o$	1 – 1	
32			3990.421	120 092.919	145 145.84	$3s5s - 3s9p$	$^3S - ^3P^o$	1 – 0	
47	40	3995.838	3995.837	121 483.50	146 502.47	$3s4d - 3s9f$	$^3D - ^3F^o$	3 – 4	K1
47	10	3996.075	3996.074	121 483.50	146 500.99	$3s4d - 3s9f$	$^3D - ^3F^o$	3 – 3	S2
47	30	3996.143	3996.141	121 483.92	146 500.99	$3s4d - 3s9f$	$^3D - ^3F^o$	2 – 3	K1
47	5	3996.182	3996.194	121 484.252	146 500.99	$3s4d - 3s9f$	$^3D - ^3F^o$	1 – 3	S2
47	5	3996.323	3996.315	121 483.92	146 499.90	$3s4d - 3s9f$	$^3D - ^3F^o$	2 – 2	S2
47	20	3996.370	3996.368	121 484.252	146 499.90	$3s4d - 3s9f$	$^3D - ^3F^o$	1 – 2	K1
89	2	4005.7	4005.75	124 794.13	149 751.2	$3s4d - 3s16p$	$^1D - ^1P^o$	2 – 1	S2
37	2	4009.58	4009.583	121 366.72	146 299.92	$3s5s - 3s10p$	$^1S - ^1P^o$	0 – 1	S2
24	20	4026.5	4026.318	110 089.83	134 919.40	$3s3d - 3s6p$	$^1D - ^1P^o$	2 – 1	S2
72	2	4031.135	4031.18	123 420.45	148 220.1	$3s4f - 3s11g$	$^3F^o - G$	3 –	S2
72	1	4031.210							S2
72	1*d*	4031.633	4031.65	123 423.36	148 220.1	$3s4f - 3s11g$	$^3F^o - G$	4 –	S2
62	2	4039.302	4039.33	123 470.5	148 220.1	$3s4f - 3s11g$	$^1F^o - G$	3 –	S2
62	1	4039.397							S2
88	2	4056.8	4056.795	124 794.13	149 437.17	$3s4d - 3s15p$	$^1D - ^1P^o$	2 – 1	S2
71	1	4159.407	4159.44	123 418.48	147 453.4	$3s4f - 3s10g$	$^3F^o - G$	2 –	S2
71	2	4159.450							S2
71	3	4159.728	4159.78	123 420.45	147 453.4	$3s4f - 3s10g$	$^3F^o - G$	3 –	S2
71	2	4159.809							S2
71	5	4160.239	4160.28	123 423.36	147 453.4	$3s4f - 3s10g$	$^3F^o - G$	4 –	S2
71	6	4160.263							S2
61	3	4168.424	4168.46	123 470.5	147 453.4	$3s4f - 3s10g$	$^1F^o - G$	3 –	S2
61	3	4168.511							S2
46	50	4226.813	4226.816	121 483.50	145 135.31	$3s4d - 3s8f$	$^3D - ^3F^o$	3 – 4	K1

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
43	5	5093.65	5093.82	121 483.92	–	143 272.86	3s4d – 3s7f	^{3}D – ^{3}F°	2 – 3	S2
43	3	5100.34	5100.45	121 484.252	–	143 265.83	3s4d – 3s7f	^{3}D – ^{3}F°	1 – 2	S2
68	500	5144.413	5144.42	123 418.48	–	142 851.6	3s4f – 3s7g	^{3}F° – G	2 –	S2
68	500	5144.884 }	5144.94	123 420.45	–	142 851.6	3s4f – 3s7g	^{3}F° – G	3 –	K1
68	300	5145.008 }								K1
68	500	5145.654	5145.71	123 423.36	–	142 851.6	3s4f – 3s7g	^{3}F° – G	4 –	S2
58	200	5158.177 }	5158.23	123 470.5	–	142 851.6	3s4f – 3s7g	^{1}F° – G	3 –	K1
58	300	5158.309 }								K1
67	4	5276.42	5276.396	123 418.48	–	142 365.54	3s4f – 3s7d	^{3}F° – ^{3}D	2 – 1	S2
67	4	5276.81	5276.902	123 420.45	–	142 365.69	3s4f – 3s7d	^{3}F° – ^{3}D	3 – 2	S2
67	4	5277.68	5277.632	123 423.36	–	142 365.98	3s4f – 3s7d	^{3}F° – ^{3}D	4 – 3	S2
95	6	5278.62	5278.604	125 703.14	–	144 642.27	3s5p – 3s8d	^{3}P° – ^{3}D	0 – 1	S2
95	8	5280.214	5280.216	125 708.828	–	144 642.18	3s5p – 3s8d	^{3}P° – ^{3}D	1 – 2	K1
95	100	5283.735	5283.733	125 721.703	–	144 642.45	3s5p – 3s8d	^{3}P° – ^{3}D	2 – 3	K1
102	30	5285.842	5285.838	125 869.015	–	144 782.23	3s5p – 3s8d	^{1}P° – ^{1}D	1 – 2	K1
94	4	5310.76	5310.831	125 703.14	–	144 527.35	3s5p – 3s9s	^{3}P° – ^{3}S	0 – 1	S2
94	10	5312.32	5312.434	125 708.82	–	144 527.35	3s5p – 3s9s	^{3}P° – ^{3}S	1 – 1	S2
94	15	5316.075	5316.073	125 721.703	–	144 527.35	3s5p – 3s9s	^{3}P° – ^{3}S	2 – 1	K1
101	8	5324.61	5324.713	125 869.01	–	144 644.14	3s5p – 3s9s	^{1}P° – ^{1}S	1 – 0	S2
42	12	5371.84	{ 5371.33	121 483.50	–	140 095.7	3s4d – 3s7p	^{3}D – ^{3}P°	3 – 2	S2
42			{ 5372.54	121 483.92	–	140 091.9	3s4d – 3s7p	^{3}D – ^{3}P°	2 – 1	
34	2	5388.48	5388.682	121 366.725	–	139 918.98	3s5s – 3s7p	^{1}S – ^{1}P°	0 – 1	S2
78	6	5502.88	5502.936	124 794.13	–	142 961.20	3s5d – 3s8p	^{1}D – ^{1}P°	2 – 1	S2
16	800	5593.302	5593.300	106 920.56	–	124 794.13	3s4p – 3s4d	^{1}P° – ^{1}D	1 – 2	K1
77	100	5613.291	5613.290	124 794.13	–	142 604.05	3s4d – 3s7f	^{1}D – ^{1}F°	2 – 3	K1
41	100	5853.62	5853.76	121 483.50	–	138 561.8	3s4d – 3s6f	^{3}D – ^{3}F°	3 – 4	S2
41	80	5861.53	5861.77	121 483.92	–	138 538.9	3s4d – 3s6f	^{3}D – ^{3}F°	2 – 3	S2
41	50	5867.81	5867.90	121 484.252	–	138 521.4	3s4d – 3s6f	^{3}D – ^{3}F°	1 – 2	S2
100	80	5971.980	5971.970	125 869.015	–	142 609.27	3s5p – 3s7d	^{1}P° – ^{1}D	1 – 2	K1
93	3	5999.70 }	5999.875	125 703.140	–	142 365.54	3s5p – 3s7d	^{3}P° – ^{3}D	0 – 1	P1
93	2	5999.83 }								P1
109	2	6001.18	6001.26	132 778.633	–	149 437.17	3s6s – 3s15p	^{1}S – ^{1}P°	0 – 1	S2
93	60	6001.76	6001.869	125 708.828	–	142 365.69	3s5p – 3s7d	^{3}P° – ^{3}D	1 – 2	P1
93	40	6001.88	6001.924	125 708.828	–	142 365.54	3s5p – 3s7d	^{3}P° – ^{3}D	1 – 1	P1
93	200	6006.410	6006.408	125 721.703	–	142 365.98	3s5p – 3s7d	^{3}P° – ^{3}D	2 – 3	K1
99	30	6061.124	6061.116	125 869.015	–	142 363.06	3s5p – 3s8s	^{1}P° – ^{1}S	1 – 0	K1
92	15	6066.32 }	6066.36	125 703.140	–	142 182.94	3s5p – 3s8s	^{3}P° – ^{3}S	0 – 1	P1
92	10	6066.44 }								P1
92	40	6068.43 }	6068.45	125 708.828	–	142 182.94	3s5p – 3s8s	^{3}P° – ^{3}S	1 – 1	P1
92	25	6068.53 }								P1
92	50	6073.198	6073.196	125 721.703	–	142 182.94	3s5p – 3s8s	^{3}P° – ^{3}S	2 – 1	K1
66	50	6181.57 }	6181.58	123 418.48	–	139 591.1	3s4f – 3s6g	^{3}F° – G	2 – 3	P1
66	60	6181.68 }								P1
66	500	6182.262 }	6182.33	123 420.45	–	139 591.1	3s4f – 3s6g	^{3}F° – G	3 –	K1
66	300	6182.447 }								K1
66	1000d	6183.42	6183.44	123 423.36	–	139 591.1	3s4f – 3s6g	^{3}F° – G	4 –	P1
57	300	6201.463 }	6201.53	123 470.5	–	139 591.1	3s4f – 3s6g	^{1}F° – G	3 –	K1
57	200	6201.655 }								K1
10	50	6226.18	6226.19	105 427.52	–	121 484.252	3s4p – 3s4d	^{3}P° – ^{3}D	0 – 1	K1
10	75	6231.745	6231.750	105 441.50	–	121 483.92	3s4p – 3s4d	^{3}P° – ^{3}D	1 – 2	K1
10	100	6243.36	6243.37	105 470.93	–	121 483.50	3s4p – 3s4d	^{3}P° – ^{3}D	2 – 3	P1
22	30	6335.701	6335.71	110 089.83	–	125 869.015	3s3d – 3s5p	^{1}D – ^{1}P°	2 – 1	K1
65		6495.45	6495.19	123 423.36	–	138 815.12	3s4f – 3s6d	^{3}F° – ^{3}D	4 – 3	S2
76		6609.64	6609.81	124 794.13	–	139 918.98	3s4d – 3s7p	^{1}D – ^{1}P°	2 – 1	P1
29	2	6696.39	6696.430	120 092.919	–	135 022.127	3s5s – 3s6p	^{3}S – ^{3}P°	1 – 2	S2
29	1	6699.46	6699.314	120 092.919	–	135 015.701	3s5s – 3s6p	^{3}S – ^{3}P°	1 – 1	S2

Al II – Continued

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
111			6777.06	132 822.80	147 574.4	3s5d – 3s11p	$^3D - {}^3P^\circ$	2 –	
111			6777.10	132 822.89	147 574.4	3s5d – 3s11p	$^3D - {}^3P^\circ$	3 – 2	
111			6777.12	132 822.95	147 574.4	3s5d – 3s11p	$^3D - {}^3P^\circ$	1 –	
9	10	6816.69	6816.89	105 427.52	120 092.919	3s4p – 3s5s	$^3P^\circ - {}^3S$	0 – 1	P1
9	50	6823.48	6823.39	105 441.50	120 092.919	3s4p – 3s5s	$^3P^\circ - {}^3S$	1 – 1	P1
9	80	6837.14	6837.13	105 470.93	120 092.919	3s4p – 3s5s	$^3P^\circ - {}^3S$	2 – 1	P1
75	10	6917.93	6917.93	124 794.13	139 245.34	3s4d – 3s6f	$^1D - {}^1F^\circ$	2 – 3	P1
15	1	6919.96	6920.34	106 920.56	121 366.725	3s4p – 3s5s	$^1P^\circ - {}^1S$	1 – 0	S2
3	100	7042.06	7042.08	91 274.50	105 470.93	3s4s – 3s4p	$^3S - {}^3P^\circ$	1 – 2	P1
3	50	7056.60	7056.71	91 274.50	105 441.50	3s4s – 3s4p	$^3S - {}^3P^\circ$	1 – 1	P1
3	10	7063.64	7063.68	91 274.50	105 427.52	3s4s – 3s4p	$^3S - {}^3P^\circ$	1 – 0	P1
114			7132.89	133 437.71	147 453.4	3s5f – 3s10g	$^3F^\circ$ – G	2 –	
114			7135.63	133 443.08	147 453.4	3s5f – 3s10g	$^3F^\circ$ – G	3 –	
114	2	7138.81	7139.19	133 450.07	147 453.4	3s5f – 3s10g	$^3F^\circ$ – G	4 –	S2
98	50	7449.42	7449.44	125 869.015	139 289.15	3s5p – 3s6d	$^1P^\circ - {}^1D$	1 – 2	P1
21	90	7471.41	7471.41	110 089.83	123 470.5	3s3d – 3s4f	$^1D - {}^1F^\circ$	2 – 3	P1
119	2	7526.2	7526.2	134 183.7	147 467.0	3s5g – 3s10h	G – H°		P1
91	5	7624.48	7624.66	125 703.140	138 814.87	3s5p – 3s6d	$^3P^\circ - {}^3D$	0 – 1	P1
91	10	7627.85	7627.96	125 708.828	138 814.87	3s5p – 3s6d	$^3P^\circ - {}^3D$	1 – 2	P1
91	20	7635.33	7635.32	125 721.703	138 815.12	3s5p – 3s6d	$^3P^\circ - {}^3D$	2 – 3	P1
113	1	7709.78	7709.86	133 450.07	146 416.9	3s5f – 3s9g	$^3F^\circ$ – G	4 –	P1
90	5	7812.31	7812.33	125 703.140	138 499.89	3s5p – 3s7s	$^3P^\circ - {}^3S$	0 – 1	P1
90	10	7815.83	7815.80	125 708.828	138 499.89	3s5p – 3s7s	$^3P^\circ - {}^3S$	1 – 1	P1
90	20	7823.72	7823.68	125 721.703	138 499.89	3s5p – 3s7s	$^3P^\circ - {}^3S$	2 – 1	P1
116	5	8086.91	8086.86	133 916.36	146 278.70	3s5d – 3s9f	$^1D - {}^1F^\circ$	2 – 3	P1
110	15	8119.72	8119.65	132 822.89	145 135.31	3s5d – 3s8f	$^3D - {}^3F^\circ$	3 – 4	P1
110	2	8121.89 }	8121.82	132 822.80	145 131.93	3s5d – 3s8f	$^3D - {}^3F^\circ$	2 – 3	P1
110	5	8122.08 }							P1
110	1	8123.52	{ 8123.42	132 822.80	145 129.51	3s5d – 3s8f	$^3D - {}^3F^\circ$	2 – 2	P1
110			{ 8123.47	132 822.89	145 129.51	3s5d – 3s8f	$^3D - {}^3F^\circ$	3 – 2	P1
110			{ 8123.51	132 822.95	145 129.51	3s5d – 3s8f	$^3D - {}^3F^\circ$	1 – 2	P1
118	30	8160.15	8160.16	134 183.7	146 435.0	3s5g – 3s9h	G – H°		P1
40	100	8354.318	8354.32	121 483.50	133 450.07	3s4d – 3s5f	$^3D - {}^3F^\circ$	3 – 4	K1
40	5	8359.23	8359.20	121 483.50	133 443.08	3s4d – 3s5f	$^3D - {}^3F^\circ$	3 – 3	P1
40	50	8359.492	8359.49	121 483.92	133 443.08	3s4d – 3s5f	$^3D - {}^3F^\circ$	2 – 3	K1
40	5	8363.251	8363.25	121 483.92	133 437.71	3s4d – 3s5f	$^3D - {}^3F^\circ$	2 – 2	K1
40	50	8363.469	8363.48	121 484.252	133 437.71	3s4d – 3s5f	$^3D - {}^3F^\circ$	1 – 2	K1
4	100	8640.705	8640.70	95 350.60	106 920.56	3s4s – 3s4p	$^1S - {}^1P^\circ$	0 – 1	K1
112	5	8671.06 }	8671.1	133 437.71	144 967.1	3s5f – 3s8g	$^3F^\circ$ – G	2 – 3	P1
112	10	8671.28 }							P1
112	20	8674.92 }	8675.1	133 443.08	144 967.1	3s5f – 3s8g	$^3F^\circ$ – G	3 –	P1
112	10	8675.28 }							P1
112	30	8680.26 }	8680.4	133 450.07	144 967.1	3s5f – 3s8g	$^3F^\circ$ – G	4 –	P1
112	25	8680.36 }							P1
115	10	8858.39 }	8858.6	133 681.78	144 967.1	3s5f – 3s8g	$^1F^\circ$ – G	3 –	P1
115	5	8858.77 }							P1
108			9126.14	132 215.517	143 170.04	3s6s – 3s8p	$^3S - {}^3P^\circ$	1 – 2	
117	10	9249.41	9249.4	134 183.7	144 992.2	3s5g – 3s8h	G – H°		P1
64	10	9286.578 }	9286.6	123 418.48	134 183.7	3s4f – 3s5g	$^3F^\circ$ – G	2 –	P1
64	20	9286.794 }							P1
64	30	9288.145 }	9288.3	123 420.45	134 183.7	3s4f – 3s5g	$^3F^\circ$ – G	3 –	P1
64	20	9288.550 }							P1
64	50	9290.649 }	9290.8	123 423.36	134 183.7	3s4f – 3s5g	$^3F^\circ$ – G	4 –	P1
64	40	9290.747 }							P1
56	30	9331.546 }	9331.7	123 470.5	134 183.7	3s4f – 3s5g	$^1F^\circ$ – G	3 –	P1
56	20	9331.979 }							P1

Mult. No.	Rel. Int.	Wavenumber (cm^{-1}) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
6	60	9921.57	9921.51	95 549.42	105 470.93	3s3d – 3s4p	^{3}D – ^{3}P	2 – 3	P1
6	10	9920.55	9920.42	95 550.51	105 470.93	3s3d – 3s4p	^{3}D – ^{3}P	2 – 2	P1
6	5	9920.35							P1
6	40	9891.23	9890.99	95 550.51	105 441.50	3s3d – 3s4p	^{3}D – ^{3}P	2 – 1	P1
6	5	9890.43	9890.06	95 551.44	105 441.50	3s3d – 3s4p	^{3}D – ^{3}P	1 – 1	P1
6	2	9890.08							P1
6	5	9876.28	9876.08	95 551.44	105 427.52	3s3d – 3s4p	^{3}D – ^{3}P	1 – 0	P1
	16	8887.641	8887.65	124 794.13	133 681.78	3s4d – 3s5f	^{1}D – ^{1}F°	2 – 3	B1
	2	8703.98	8704.0	134 183.7	142 887.7	3s5g – 3s7h	G – H°		B1
	41	8047.353	8047.353	125 869.015	133 916.368	3s5p – 3s5d	^{1}P° – ^{1}D	1 – 2	B1
	36	7120.021	7119.81	125 703.140	132 822.95	3s5p – 3s5d	^{3}P° – ^{3}D	0 – 1	B1
	36	7119.710							B1
	14	7119.514							B1
	35	7114.378	7114.12	125 708.828	132 822.95	3s5p – 3s5d	^{3}P° – ^{3}D	1 – 1	B1
	110	7114.185	7113.97	125 708.828	132 822.80	3s5p – 3s5d	^{3}P° – ^{3}D	1 – 2	B1
	15	7114.066							B1
	16	7113.966							B1
	62	7113.877							B1
	6	7101.582	7101.25	125 721.703	132 822.95	3s5p – 3s5d	^{3}P° – ^{3}D	2 – 1	B1
	30	7101.386	7101.19	125 721.703	132 822.89	3s5p – 3s5d	^{3}P° – ^{3}D	2 – 3	B1
	56	7101.268	7101.10	125 721.703	132 822.80	3s5p – 3s5d	^{3}P° – ^{3}D	2 – 2	B1
	182	7101.192							B1
	85	7101.105							B1
	35	6909.618	6909.618	125 869.015	132 778.633	3s5p – 3s6s	^{1}P° – ^{1}S	1 – 0	B1
	18	6512.586	6512.377	125 703.140	132 215.517	3s5p – 3s6s	^{3}P° – ^{3}S	0 – 1	B1
	15	6512.294							B1
	11	6512.085							B1
	23	6506.941	6506.689	125 708.828	132 215.517	3s5p – 3s6s	^{3}P° – ^{3}S	1 – 1	B1
	52	6506.780							B1
	2	6506.648							B1
	10	6506.564							B1
	22	6506.491							B1
	21	6506.440							B1
	4	6494.145	6493.814	125 721.703	132 215.517	3s5p – 3s6s	^{3}P° – ^{3}S	2 – 1	B1
	22	6494.003							B1
	10	6493.954							B1
	85	6493.820							B1
	24	6493.743							B1
	40	6493.711							B1
	14	6493.644							B1
	2	6153.709	6153.4	133 437.71	139 591.1	3s5f – 3s6g	^{3}F° – ^{3}G	2 – 3	B1
	2	6153.517							B1
	3	6153.411							B1
	3	6153.332							B1
	3	6153.286							B1
	9	6153.119							B1
	5	6153.036							B1
	2	6152.981							B1
	19	6148.259	6148.0	133 443.08	139 591.1	3s5f – 3s6g	^{3}F° – ^{3}G	3 –	B1
	4	6147.848							B1
	5	6147.814							B1
	7	6147.774							B1
	8	6147.731							B1

Al II – *Continued*

Mult. No.	Rel. Int.	Wavenumber (cm^{-1}) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	*J* Values	Ref.
	3	6141.385	6141.0	133 450.07	139 591.1	3*s*5*f* – 3*s*6*g*	^{3}F° – ^{3}G	4 –	B1
	4	6141.325							B1
	4	6141.280							B1
	5	6141.243							B1
	8	6141.204							B1
	17	6141.114							B1
	5	6141.049							B1
	5	6140.989							B1
	5	6140.909							B1
	4	6140.805							B1
	2	6140.678							B1
	15	5909.536	5909.3	133 681.78	139 591.1	3*s*5*f* – 3*s*6*g*	^{1}F° – ^{1}G	3 – 4	B1
	8	5909.01							B1
	9	5739.366	5738.9	132 822.89	138 561.8	3*s*5*d* – 3*s*6*f*	^{3}D – ^{3}F°	3 – 4	B1
	3	5739.045							B1
	85	5738.940							B1
	6	5738.856							B1
	17	5738.794							B1
	3	5738.731							B1
	6	5738.682							B1
	2	5738.582							B1
	8	5716.221	5716.1	132 822.80	138 538.9	3*s*5*d* – 3*s*6*f*	^{3}D – ^{3}F°	2 – 3	B1
	6	5716.082	5716.0	132 822.89	138 538.9	3*s*5*d* – 3*s*6*f*	^{3}D – ^{3}F°	3 – 3	B1
	7	5715.976							B1
	6	5715.797							B1
	5	5715.744							B1
	5	5698.600	5698.6	132 822.80	138 521.4	3*s*5*d* – 3*s*6*f*	^{3}D – ^{3}F°	2 – 2	B1
	2	5698.551	5698.5	132 822.89	138 521.4	3*s*5*d* – 3*s*6*f*	^{3}D – ^{3}F°	3 – 2	B1
	4	5698.484	5698.4	132 822.95	138 521.4	3*s*5*d* – 3*s*6*f*	^{3}D – ^{3}F°	1 – 2	B1
	4	5698.406							B1
	4	5698.280							B1
	4	5698.242							B1
	3	5698.195							B1
	2	5698.120							B1
	631	5628.964	5628.784	120 092.919	125 721.703	3*s*5*s* – 3*s*5*p*	^{3}S – ^{3}P°	1 – 2	B1
	1778	5628.890							B1
	1072	5628.862							B1
	3715	5628.770							B1
	437	5628.646							B1
	1000	5628.590							B1
	178	5628.448							B1
	1072	5616.167	5615.909	120 092.919	125 708.828	3*s*5*s* – 3*s*5*p*	^{3}S – ^{3}P°	1 – 1	B1
	1148	5616.110							B1
	447	5616.043							B1
	105	5615.953							B1
	2188	5615.812							B1
	1072	5615.651							B1
	562	5610.522	5610.221	120 092.919	125 703.140	3*s*5*s* – 3*s*5*p*	^{3}S – ^{3}P°	1 – 0	B1
	832	5610.307							B1
	1000	5610.006							B1
	126	5461.411	5461.4	134 183.7	139 645.1	3*s*5*g* – 3*s*6*h*	G – H°		B1
	2	5401.16	5401.1	139 591.1	144 992.2	3*s*6*g* – 3*s*8*h*	G – H°		B1
	18	5328.975	5328.975	133 916.368	139 245.343	3*s*5*d* – 3*s*6*f*	^{1}D – ^{1}F°	2 – 3	B1
	347	4502.290	4502.290	121 366.725	125 869.015	3*s*5*s* – 3*s*5*p*	^{1}S – ^{1}P°	0 – 1	B1
	5	4369.802	4369.75	134 919.40	139 289.15	3*s*6*p* – 3*s*6*d*	^{1}P° – ^{1}D	1 – 2	B1
	3	4342.218	4342.103	121 366.725	125 708.828	3*s*5*s* – 3*s*5*p*	^{1}S – ^{3}P°	0 – 1	B1
	3	4342.061							B1
	2	4341.935							B1

Mult. No.	Rel. Int.	Wavenumber (cm^{-1}) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	4	4238.571	4238.20	121 483.50	125 721.703	$3s4d-3s5p$	$^{3}D-{}^{3}P^{o}$	3 – 2	B1
	66	4238.448	4237.78	121 483.92	125 721.703	$3s4d-3s5p$	$^{3}D-{}^{3}P^{o}$	2 – 2	B1
	145	4238.389	4237.451	121 484.252	125 721.703	$3s4d-3s5p$	$^{3}D-{}^{3}P^{o}$	1 – 2	B1
	195	4238.325							B1
	1820	4238.261							B1
	23	4238.114							B1
	302	4237.956							B1
	170	4237.933							B1
	107	4237.817							B1
	95	4237.723							B1
	95	4237.723							B1
	19	4237.663							B1
	18	4237.540							B1
	31	4237.440							B1
	11	4237.238							B1
	2	4237.135							B1
	12	4225.610	4224.91	121 483.92	125 708.828	$3s4d-3s5p$	$^{3}D-{}^{3}P^{o}$	2 – 1	B1
	15	4225.530	4224.576	121 484.252	125 708.828	$3s4d-3s5p$	$^{3}D-{}^{3}P^{o}$	1 – 1	B1
	66	4225.485							B1
	48	4225.453							B1
	11	4225.405							B1
	20	4225.148							B1
	1023	4224.994							B1
	407	4224.901							B1
	324	4224.759							B1
	126	4224.659							B1
	91	4224.501							B1
	145	4224.441							B1
	31	4224.378							B1
	15	4224.317							B1
	120	4219.349	4218.888	121 484.252	125 703.140	$3s4d-3s5p$	$^{3}D-{}^{3}P^{o}$	1 – 0	B1
	309	4218.957							B1
	263	4218.856							B1
	191	4218.796							B1
	1	3881.238	3881.20	134 919.40	138 800.60	$3s6p-3s7s$	$^{1}P^{o}-{}^{1}S$	1 – 0	B1
	2	3799.513	3799.17	135 015.701	138 814.87	$3s6p-3s6d$	$^{3}P^{o}-{}^{3}D$	1 –	B1
	1	3799.463							B1
	1	3799.403							B1
	5	3799.206							B1
	2	3799.063							B1
	2	3793.142	3792.99	135 022.127	138 815.12	$3s6p-3s6d$	$^{3}P^{o}-{}^{3}D$	2 – 3	B1
	2	3793.077	3792.74	135 022.127	138 814.87	$3s6p-3s6d$	$^{3}P^{o}-{}^{3}D$	2 – 2	B1
	7	3793.009							B1
	3	3792.848							B1
	5	3484.329	3484.19	135 015.701	138 499.89	$3s6p-3s7s$	$^{3}P^{o}-{}^{3}S$	1 – 1	B1
	13	3477.788	3477.76	135 022.127	138 499.89	$3s6p-3s7s$	$^{3}P^{o}-{}^{3}S$	2 – 1	B1
	16	3296.619	3296.6	139 591.1	142 887.7	$3s6g-3s7h$	$G-H^{o}$		B1
	58	3253.231	3253.2	139 645.1	142 898.3	$3s6h-3s7i$	$H^{o}-I$		B1
	13	3169.285	3169.27	106 920.56	110 089.83	$3s4p-3s3d$	$^{1}P^{o}-{}^{1}D$	1 – 2	B1
	17	2806.781	2806.610	132 215.517	135 022.127	$3s6s-3s6p$	$^{3}S-{}^{3}P^{o}$	1 – 2	B1
	41	2806.715							B1
	23	2806.679							B1
	66	2806.601							B1
	35	2806.573							B1
	13	2806.469							B1
	26	2806.421							B1

WAVELENGTHS AND ENERGY LEVELS OF ALUMINUM

Al II – Continued

Mult. No.	Rel. Int.	Wavenumber (cm⁻¹) Observed	Calculated	Levels (cm⁻¹) Lower	Upper	Configurations	Terms	J Values	Ref.
	23	2800.447	2800.184	132 215.517	135 015.701	3s6s – 3s6p	$^3S - {}^3P^o$	1 – 1	B1
	33	2800.353							B1
	25	2800.138							B1
	40	2800.062							B1
	27	2799.946							B1
	15	2797.061	2796.768	132 215.517	135 012.285	3s6s – 3s6p	$^3S - {}^3P^o$	1 – 0	B1
	19	2796.850							B1
	22	2796.559							B1
	20	2199.351	2199.33	132 822.80	135 022.127	3s5d – 3s6p	$^3D - {}^3P^o$	2 – 2	B1
	30	2199.321	2199.24	132 822.89	135 022.127	3s5d – 3s6p	$^3D - {}^3P^o$	3 – 2	B1
	21	2199.276	2199.18	132 822.95	135 022.127	3s5d – 3s6p	$^3D - {}^3P^o$	1 – 2	B1
	52	2199.233							B1
	25	2199.156							B1
	16	2193.359	2192.90	132 822.80	135 015.701	3s5d – 3s6p	$^3D - {}^3P^o$	2 – 1	B1
	19	2193.019	2192.75	132 822.95	135 015.701	3s5d – 3s6p	$^3D - {}^3P^o$	1 – 1	B1
	18	2192.962							B1
	13	2192.823							B1
	23	2192.725							B1
	23	2192.678							B1
	20	2192.655							B1
	16	2192.501							B1
	26	2140.736	2140.77	132 778.633	134 919.40	3s6s – 3s6p	$^1S - {}^1P^o$	0 – 1	B1
	25	2140.713		132 778.633	134 919.40	3s6s – 3s6p	$^1S - {}^1P^o$	0 – 1	B1
	117	1939.857	1939.86	121 483.50	123 423.36	3s4d – 3s4f	$^3D - {}^3F^o$	3 – 4	B1
	43	1939.812							B1
	162	1939.787							B1
	29	1939.747							B1
	23	1939.666							B1
	17	1937.157	1936.95	121 483.50	123 420.45	3s4d – 3s4f	$^3D - {}^3F^o$	3 – 3	B1
	21	1937.126	1936.53	121 483.92	123 420.45	3s4d – 3s4f	$^3D - {}^3F^o$	2 – 3	B1
	25	1937.066							B1
	27	1936.961							B1
	17	1936.775							B1
	76	1936.608							B1
	76	1936.591							B1
	81	1936.469							B1
	25	1936.215							B1
			1934.98	121 483.50	123 418.48	3s4d – 3s4f	$^3D - {}^3F^o$	3 – 2	
	18	1934.695	1934.56	121 483.92	123 418.48	3s4d – 3s4f	$^3D - {}^3F^o$	2 – 2	B1
	28	1934.592	1934.23	121 484.252	123 418.48	3s4d – 3s4f	$^3D - {}^3F^o$	1 – 2	B1
	45	1934.457							B1
	28	1934.223							B1
	66	1934.177							B1
	22	1934.110							B1
	54	1934.067							B1

Al III

Na I isoelectronic sequence

Ground state $1s^22s^22p^63s\ ^2S_{1/2}$

Ionization energy 229 445.7 ± 0.2 cm^{-1} (28.447 65 ± 0.000 08 eV)

The four-place calculated wavelengths in the region 486 – 1936 Å have estimated errors from 0.0006 Å at the shortest wavelengths to about 0.003 Å at 2000 Å [I1]. We have included calculated wavelengths for all lines tabulated by Isberg, even though many of these lines in the region below 3000 Å have not yet been observed. The calculated wavelengths above 2000 Å are based on Isberg's measurements having estimated errors of about 0.010 Å for the three-place values and 0.03 Å for the two-place values.

Transitions involving levels based on $2p$ excitation have been observed below 200 Å both in emission [F1] and absorption [B5, B6]. Pending further research and compilation of the excited-core levels, we have included here only the stronger and/or more certainly classified of these lines; additional wavelengths are given in the references [F1, B5, B6]. The tabulated lines below 200 Å are classified by upper levels of the excited-core configurations $2p^53s^2$, $2p^53p^2$, $2p^53s3d$, and $2p^53s3p$. We also include longer-wavelength lines (in the 1192 – 1596 Å range) classified as transitions *within* the excited-core system; these are quartet-system transitions of the $2p^53s3p - 2p^53p^2$, $3s3d$ arrays [G1]. The uncertainties of these longer-wavelength measurements, ±0.08 to ±0.15 Å, correspond to uncertainties of ±10 cm^{-1} or less in the relative positions of the ten quartet levels involved [G1]. We fixed the position of this ten-level group relative to the $2p^6nl$ single-electron system by using the unblended $2p^63p\ ^2P^\circ_{3/2} - 2p^53s3p\ ^4D_{5/2}$, $^4P_{5/2}$ lines from [F1].

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Al III

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	*J* Values	Ref.
	g,a	137.46	137.46	0.00	–	727 500	$2p^63s - 2p^5(^2P^\circ)3s3d(^3D)$	$^2S - ^2P^\circ$	1/2 – 1/2	B5
	g,a	137.83	137.83	0.00	–	725 530	$2p^63s - 2p^5(^2P^\circ)3s3d(^3D)$	$^2S - ^2P^\circ$	1/2 – 3/2	B5
	g,a	138.10	138.11	0.00	–	724 080	$2p^63s - 2p^5(^2P^\circ)3s3d(^3D)$	$^2S - ^2D^\circ$	1/2 – 3/2	B5
	g,a	138.83	138.83	0.00	–	720 300	$2p^63s - 2p^5(^2P^\circ)3s3d(^3D)$	$^2S - ^4D^\circ$	1/2 – 1/2	B5
	g,a	143.95	143.95	0.00	–	694 700	$2p^63s - 2p^5(^2P^\circ)3p^2(^1D)$	$^2S - ^2P^\circ$	1/2 – 3/2	B5
	g,a	144.17	144.17	0.00	–	693 650	$2p^63s - 2p^5(^2P^\circ)3p^2(^1D)$	$^2S - ^2P^\circ$	1/2 – 1/2	B5
	9*g*	169.07	169.07	0.00	–	591 470	$2p^63s - 2p^53s^2$	$^2S - ^2P^\circ$	1/2 – 1/2	F1
	6	169.73	169.75	53 682.93	–	642 800	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^2P$	1/2 – 3/2	B6
	7	169.82	169.81	53 916.60	–	642 800	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^2P$	3/2 – 3/2	B6
	10*g,bl*	170.11	{170.0	53 682.93	–	642 000	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^2P$	1/2 – 1/2	B6
			{170.11	0.00	–	587 850	$2p^63s - 2p^53s^2$	$^2S - ^2P^\circ$	1/2 – 3/2	
	8	170.24	170.25	53 916.60	–	641 300	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^2D$	3/2 – 5/2	F1,B6
	7	170.49	170.50	53 682.93	–	640 200	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^2D$	1/2 – 3/2	B6
	6	170.57	170.57	53 916.60	–	640 200	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^2D$	3/2 – 3/2	B6
	2	171.04	171.05	53 682.93	–	638 300	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^4P$	1/2 – 3/2	B6
	3	171.12	171.12	53 916.60	–	638 300	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^4P$	3/2 – 3/2	B6
	6	171.37	171.37	53 916.60	–	637 451	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^4P$	3/2 – 5/2	F1
	2	172.1	{172.05	53 682.93	–	634 900	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^4D$	1/2 – 1/2	F1
			{172.12	53 916.60	–	634 900	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^4D$	3/2 – 1/2	
	2	172.31	172.31	53 682.93	–	634 039	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^4D$	1/2 – 3/2	F1
	2	172.45	172.38	53 916.60	–	634 039	$2p^63p - 2p^5(^2P^\circ)3s3p(^3P^\circ)$	$^2P^\circ - ^4D$	3/2 – 3/2	B6

Al III – Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm⁻¹) Lower	Upper	Configurations	Terms	J Values	Ref.
	7	172.62	172.62	53 916.60	633 220	$2p^63p-2p^5(^2P^o)3s3p(^3P^o)$	$^2P^o-{}^4D$	3/2 – 5/2	F1
	6	175.02	174.95	53 682.93	625 260	$2p^63p-2p^5(^2P^o)3s3p(^3P^o)$	$^2P^o-{}^4S$	1/2 – 3/2	F1
			175.03	53 916.60	625 260	$2p^63p-2p^5(^2P^o)3s3p(^3P^o)$	$^2P^o-{}^4S$	3/2 – 3/2	
	70*g*	486.95	486.8839	0.00	205 387.77	$3s-7p$	$^2S-{}^2P^o$	1/2 – 3/2	E2
			486.9124	0.00	205 375.74	$3s-7p$	$^2S-{}^2P^o$	1/2 – 1/2	
	250*g*	511.215	511.1384	0.00	195 641.74	$3s-6p$	$^2S-{}^2P^o$	1/2 – 3/2	E2
			511.1907	0.00	195 621.72	$3s-6p$	$^2S-{}^2P^o$	1/2 – 1/2	
UV3	500*g*	560.390	560.3173	0.00	178 470.32	$3s-5p$	$^2S-{}^2P^o$	1/2 – 3/2	E2
UV3			560.4331	0.00	178 433.43	$3s-5p$	$^2S-{}^2P^o$	1/2 – 1/2	
			644.3339	53 682.93	208 881.83	$3p-7d$	$^2P^o-{}^2D$	1/2 – 3/2	
			645.3063	53 916.60	208 881.83	$3p-7d$	$^2P^o-{}^2D$	3/2 –	
	100	670.144	670.0676	53 682.93	202 921.60	$3p-7s$	$^2P^o-{}^2S$	1/2 – 1/2	E2
	200	671.198	671.1184	53 916.60	202 921.60	$3p-7s$	$^2P^o-{}^2S$	3/2 – 1/2	E2
			677.0819	53 682.93	201 375.56	$3p-6d$	$^2P^o-{}^2D$	1/2 – 3/2	
			678.1548	53 916.60	201 375.56	$3p-6d$	$^2P^o-{}^2D$	3/2 – 3/2	
			678.1564	53 916.60	201 375.20	$3p-6d$	$^2P^o-{}^2D$	3/2 – 5/2	
UV2	500*g*	695.817	695.8289	0.00	143 713.50	$3s-4p$	$^2S-{}^2P^o$	1/2 – 3/2	E2
UV2	400*g*	696.212	696.2170	0.00	143 633.38	$3s-4p$	$^2S-{}^2P^o$	1/2 – 1/2	E2
	200	725.716	725.6826	53 682.93	191 484.23	$3p-6s$	$^2P^o-{}^2S$	1/2 – 1/2	E2
	300	726.948	726.9152	53 916.60	191 484.23	$3p-6s$	$^2P^o-{}^2S$	3/2 – 1/2	E2
			739.6707	53 682.93	188 878.22	$3p-5d$	$^2P^o-{}^2D$	1/2 – 3/2	
			740.9514	53 916.60	188 878.22	$3p-5d$	$^2P^o-{}^2D$	3/2 – 3/2	
			740.9550	53 916.60	188 877.57	$3p-5d$	$^2P^o-{}^2D$	3/2 – 5/2	
	400	855.040	855.0340	53 682.93	170 637.35	$3p-5s$	$^2P^o-{}^2S$	1/2 – 1/2	E2
	500	856.768	856.7457	53 916.60	170 637.35	$3p-5s$	$^2P^o-{}^2S$	3/2 – 1/2	E2
	1*g*, E2	862.382	862.3775	0.00	115 958.50	$3s-3d$	$^2S-{}^2D$	1/2 – 3/2	G4
	400	892.056	892.0242	53 682.93	165 787.51	$3p-4d$	$^2P^o-{}^2D$	1/2 – 3/2	E2
	450	893.905	893.8874	53 916.60	165 787.51	$3p-4d$	$^2P^o-{}^2D$	3/2 – 3/2	E2
			893.8969	53 916.60	165 786.32	$3p-4d$	$^2P^o-{}^2D$	3/2 – 5/2	
			1071.730	115 956.21	209 263.25	$3d-7f$	$^2D-{}^2F^o$	5/2 –	
			1071.757	115 958.50	209 263.25	$3d-7f$	$^2D-{}^2F^o$	3/2 – 5/2	
			1118.173	115 956.21	205 387.77	$3d-7p$	$^2D-{}^2P^o$	5/2 – 3/2	
			1118.202	115 958.50	205 387.77	$3d-7p$	$^2D-{}^2P^o$	3/2 – 3/2	
			1118.353	115 958.50	205 375.74	$3d-7p$	$^2D-{}^2P^o$	3/2 – 1/2	
	10	1162.66	1162.589	115 956.21	201 971.16	$3d-6f$	$^2D-{}^2F^o$	5/2 –	E2
			1162.620	115 958.50	201 971.16	$3d-6f$	$^2D-{}^2F^o$	3/2 – 5/2	
		1192.60	1192.61	632 453	716 303	$2p^5(^2P^o)3s3p(^3P^o)-2p^5(^2P^o)3s3d(^3D)$	$^4D-{}^4F^o$	7/2 – 9/2	G4
			1254.933	115 956.21	195 641.74	$3d-6p$	$^2D-{}^2P^o$	5/2 – 3/2	
			1254.969	115 958.50	195 641.74	$3d-6p$	$^2D-{}^2P^o$	3/2 – 3/2	
			1255.284	115 958.50	195 621.72	$3d-6p$	$^2D-{}^2P^o$	3/2 – 1/2	
			1262.248	126 164.05	205 387.77	$4s-7p$	$^2S-{}^2P^o$	1/2 – 3/2	
			1262.440	126 164.05	205 375.74	$4s-7p$	$^2S-{}^2P^o$	1/2 – 1/2	
		1274.05	1274.05	637 451	715 941	$2p^5(^2P^o)3s3p(^3P^o)-2p^5(^2P^o)3s3d(^3D)$	$^4P-{}^4P^o$	5/2 – 5/2	G4
		1336.05	1336.06	625 260	700 107	$2p^5(^2P^o)3s3p(^3P^o)-2p^5(^2P^o)3p^2(^3P)$	$^4S-{}^4P^o$	3/2 – 5/2	G4
	100	1352.857	1352.810	115 956.21	189 876.42	$3d-5f$	$^2D-{}^2F^o$	5/2 – 7/2	B2
			1352.816	115 956.21	189 876.10	$3d-5f$	$^2D-{}^2F^o$	5/2 – 5/2	
			1352.858	115 958.50	189 876.10	$3d-5f$	$^2D-{}^2F^o$	3/2 – 5/2	
	600	1379.670	1379.670	53 682.93	126 164.05	$3p-4s$	$^2P^o-{}^2S$	1/2 – 1/2	E2
	800	1384.140	1384.132	53 916.60	126 164.05	$3p-4s$	$^2P^o-{}^2S$	3/2 – 1/2	B2
		1386.94	1386.94	633 220	705 321	$2p^5(^2P^o)3s3p(^3P^o)-2p^5(^2P^o)3p^2(^3P)$	$^4D-{}^4D^o$	5/2 – 5/2	G4
		1387.93	1387.93	632 453	704 503	$2p^5(^2P^o)3s3p(^3P^o)-2p^5(^2P^o)3p^2(^3P)$	$^4D-{}^4D^o$	7/2 – 7/2	G4
		1402.87	1402.86	633 220	704 503	$2p^5(^2P^o)3s3p(^3P^o)-2p^5(^2P^o)3p^2(^3P)$	$^4D-{}^4D^o$	5/2 – 7/2	G4
			1402.88	634 039	705 321	$2p^5(^2P^o)3s3p(^3P^o)-2p^5(^2P^o)3p^2(^3P)$	$^4D-{}^4D^o$	3/2 – 5/2	

ult. o.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
			1439.311	126 164.05	195 641.74	$4s-6p$	$^2S-{}^2P^\circ$	1/2 – 3/2	
			1439.726	126 164.05	195 621.72	$4s-6p$	$^2S-{}^2P^\circ$	1/2 – 1/2	
		1473.40	1473.40	637 451	705 321	$2p^5(^2P^\circ)3s3p(^3P^\circ)-2p^5(^2P^\circ)3p^2(^3P)$	$^4P-{}^4D^\circ$	5/2 – 5/2	G4
		1478.10	1478.11	632 453	700 107	$2p^5(^2P^\circ)3s3p(^3P^\circ)-2p^5(^2P^\circ)3p^2(^3P)$	$^4D-{}^4P^\circ$	7/2 – 5/2	G4
		1491.45	1491.38	637 451	704 503	$2p^5(^2P^\circ)3s3p(^3P^\circ)-2p^5(^2P^\circ)3p^2(^3P)$	$^4P-{}^4D^\circ$	5/2 – 7/2	G4
			1532.604	143 633.38	208 881.83	$4p-7d$	$^2P^\circ-{}^2D$	1/2 – 3/2	
			1534.488	143 713.50	208 881.83	$4p-7d$	$^2P^\circ-{}^2D$	3/2 –	
		1596.00	1596.02	637 451	700 107	$2p^5(^2P^\circ)3s3p(^3P^\circ)-2p^5(^2P^\circ)3p^2(^3P)$	$^4P-{}^4P^\circ$	5/2 – 5/2	G4
			1599.639	115 956.21	178 470.32	$3d-5p$	$^2D-{}^2P^\circ$	5/2 – 3/2	
			1599.697	115 958.50	178 470.32	$3d-5p$	$^2D-{}^2P^\circ$	3/2 – 3/2	
			1600.642	115 958.50	178 433.43	$3d-5p$	$^2D-{}^2P^\circ$	3/2 – 1/2	
	700	1605.7661	1605.7661	53 682.93	115 958.50	$3p-3d$	$^2P^\circ-{}^2D$	1/2 – 3/2	I1
	100	1611.8141	1611.8140	53 916.60	115 958.50	$3p-3d$	$^2P^\circ-{}^2D$	3/2 – 3/2	I1
	800	1611.8735	1611.8734	53 916.60	115 956.21	$3p-3d$	$^2P^\circ-{}^2D$	3/2 – 5/2	I1
			1686.676	143 633.38	202 921.60	$4p-7s$	$^2P^\circ-{}^2S$	1/2 – 1/2	
			1688.958	143 713.50	202 921.60	$4p-7s$	$^2P^\circ-{}^2S$	3/2 – 1/2	
			1731.836	143 633.38	201 375.56	$4p-6d$	$^2P^\circ-{}^2D$	1/2 – 3/2	
			1734.243	143 713.50	201 375.56	$4p-6d$	$^2P^\circ-{}^2D$	3/2 – 3/2	
			1734.253	143 713.50	201 375.20	$4p-6d$	$^2P^\circ-{}^2D$	3/2 – 5/2	
UV1	1000g	1854.7164	1854.7163	0.00	53 916.60	$3s-3p$	$^2S-{}^2P^\circ$	1/2 – 3/2	I1
UV1	600g	1862.7895	1862.7896	0.00	53 682.93	$3s-3p$	$^2S-{}^2P^\circ$	1/2 – 1/2	I1
			1911.817	126 164.05	178 470.32	$4s-5p$	$^2S-{}^2P^\circ$	1/2 – 3/2	
			1913.166	126 164.05	178 433.43	$4s-5p$	$^2S-{}^2P^\circ$	1/2 – 1/2	
	300	1935.8404	1935.8401	115 956.21	167 613.37	$3d-4f$	$^2D-{}^2F^\circ$	5/2 – 7/2	I1
			1935.8633	115 956.21	167 612.75	$3d-4f$	$^2D-{}^2F^\circ$	5/2 – 5/2	
	200	1935.9489	1935.9491	115 958.50	167 612.75	$3d-4f$	$^2D-{}^2F^\circ$	3/2 – 5/2	I1
		Air Wavelength (Å)							
			2013.959	167 612.75	217 250.17	$4f-9g$	$^2F^\circ-{}^2G$	5/2 – 7/2	
			2013.984	167 613.37	217 250.17	$4f-9g$	$^2F^\circ-{}^2G$	7/2 –	
			2073.633	165 786.32	213 995.48	$4d-8f$	$^2D-{}^2F^\circ$	5/2 –	
			2073.684	165 787.51	213 995.48	$4d-8f$	$^2D-{}^2F^\circ$	3/2 – 5/2	
			2089.163	143 633.38	191 484.23	$4p-6s$	$^2P^\circ-{}^2S$	1/2 – 1/2	
			2092.667	143 713.50	191 484.23	$4p-6s$	$^2P^\circ-{}^2S$	3/2 – 1/2	
	1	2154.635	2154.613	167 612.75	214 010.22	$4f-8g$	$^2F^\circ-{}^2G$	5/2 – 7/2	P2
			2154.641	167 613.37	214 010.22	$4f-8g$	$^2F^\circ-{}^2G$	7/2 –	
			2167.356	167 612.75	213 737.44	$4f-8d$	$^2F^\circ-{}^2D$	5/2 –	
			2167.385	167 613.37	213 737.44	$4f-8d$	$^2F^\circ-{}^2D$	7/2 – 5/2	
	1d	2209.66	2209.508	143 633.38	188 878.22	$4p-5d$	$^2P^\circ-{}^2D$	1/2 – 3/2	P2
	2d	2213.56	2213.428	143 713.50	188 878.22	$4p-5d$	$^2P^\circ-{}^2D$	3/2 – 3/2	P2
			2213.460	143 713.50	188 877.57	$4p-5d$	$^2P^\circ-{}^2D$	3/2 – 5/2	
	3d	2299.47	2299.362	165 786.32	209 263.25	$4d-7f$	$^2D-{}^2F^\circ$	5/2 –	P2
			2299.425	165 787.51	209 263.25	$4d-7f$	$^2D-{}^2F^\circ$	3/2 – 5/2	
	5d	2398.98	2398.975	167 612.75	209 284.53	$4f-7g$	$^2F^\circ-{}^2G$	5/2 – 7/2	P2
			2399.011	167 613.37	209 284.53	$4f-7g$	$^2F^\circ-{}^2G$	7/2 –	
	1	2422.44	2422.386	167 612.75	208 881.83	$4f-7d$	$^2F^\circ-{}^2D$	5/2 –	P2
			2422.422	167 613.37	208 881.83	$4f-7d$	$^2F^\circ-{}^2D$	7/2 – 5/2	
			2524.401	165 786.32	205 387.77	$4d-7p$	$^2D-{}^2P^\circ$	5/2 – 3/2	
			2524.477	165 787.51	205 387.77	$4d-7p$	$^2D-{}^2P^\circ$	3/2 – 3/2	
			2525.244	165 787.51	205 375.74	$4d-7p$	$^2D-{}^2P^\circ$	3/2 – 1/2	
	9d	2762.815	2762.772	165 786.32	201 971.16	$4d-6f$	$^2D-{}^2F^\circ$	5/2 –	P2
			2762.863	165 787.51	201 971.16	$4d-6f$	$^2D-{}^2F^\circ$	3/2 – 5/2	
			2831.706	178 433.43	213 737.44	$5p-8d$	$^2P^\circ-{}^2D$	1/2 – 3/2	

Al III – Continued

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
			2834.668	178 470.32	–	213 737.44	5p – 8d	$^2P^o – ^2D$	3/2 –	
			2876.819	170 637.35	–	205 387.77	5s – 7p	$^2S – ^2P^o$	1/2 – 3/2	
			2877.815	170 637.35	–	205 375.74	5s – 7p	$^2S – ^2P^o$	1/2 – 1/2	
	10	2907.05	2906.900	167 612.75	–	202 003.58	4f – 6g	$^2F^o – ^2G$	5/2 – 7/2	P2
			2906.953	167 613.37	–	202 003.58	4f – 6g	$^2F^o – ^2G$	7/2 –	
	2	2961.06	2960.974	167 612.75	–	201 375.56	4f – 6d	$^2F^o – ^2D$	5/2 – 3/2	P2
			2961.060	167 613.37	–	201 375.20	4f – 6d	$^2F^o – ^2D$	7/2 – 5/2	
	3d	3180.111	3180.100	178 433.43	–	209 869.89	5p – 8s	$^2P^o – ^2S$	1/2 – 1/2	I1
	4d	3183.824	3183.836	178 470.32	–	209 869.89	5p – 8s	$^2P^o – ^2S$	3/2 – 1/2	I1
10	2d	3283.316	3283.299	178 433.43	–	208 881.83	5p – 7d	$^2P^o – ^2D$	1/2 – 3/2	I1
10	3d	3287.302	3287.282	178 470.32	–	208 881.83	5p – 7d	$^2P^o – ^2D$	3/2 – 5/2	I1
	9	3348.517	3348.513	165 786.32	–	195 641.74	4d – 6p	$^2D – ^2P^o$	5/2 – 3/2	I1
	8	3350.885	3350.894	165 787.51	–	195 621.72	4d – 6p	$^2D – ^2P^o$	3/2 – 1/2	I1
			3524.869	188 877.57	–	217 239.31	5d – 9f	$^2D – ^2F^o$	5/2 – 7/2	
			3524.950	188 878.22	–	217 239.31	5d – 9f	$^2D – ^2F^o$	3/2 – 5/2	
1	14	3601.628	3601.630	115 956.21	–	143 713.50	3d – 4p	$^2D – ^2P^o$	5/2 – 3/2	I1
1	11	3601.926	3601.927	115 958.50	–	143 713.50	3d – 4p	$^2D – ^2P^o$	3/2 – 3/2	I1
1	13	3612.356	3612.355	115 958.50	–	143 633.38	3d – 4p	$^2D – ^2P^o$	3/2 – 1/2	I1
			3652.052	189 876.10	–	217 250.17	5f – 9g	$^2F^o – ^2G$	5/2 – 7/2	
			3652.094	189 876.42	–	217 250.17	5f – 9g	$^2F^o – ^2G$	7/2 – 9/2	
20	1d	3658.3	3658.790	189 928.49	–	217 252.15	5g – 9h	$^2G – ^2H^o$	7/2 – 9/2	P2
20			3658.815	189 928.68	–	217 252.15	5g – 9h	$^2G – ^2H^o$	9/2 – 11/2	
			3660.510	189 928.49	–	217 239.31	5g – 9f	$^2G – ^2F^o$	7/2 – 5/2	
			3660.535	189 928.68	–	217 239.31	5g – 9f	$^2G – ^2F^o$	9/2 – 7/2	
4	10	3702.106	3702.106	143 633.38	–	170 637.35	4p – 5s	$^2P^o – ^2S$	1/2 – 1/2	I1
4	11	3713.123	3713.123	143 713.50	–	170 637.35	4p – 5s	$^2P^o – ^2S$	3/2 – 1/2	I1
12	5d	3980.14	3980.097	188 877.57	–	213 995.48	5d – 8f	$^2D – ^2F^o$	5/2 – 7/2	I1
12			3980.200	188 878.22	–	213 995.48	5d – 8f	$^2D – ^2F^o$	3/2 – 5/2	
	2	3998.164	3998.167	170 637.35	–	195 641.74	5s – 6p	$^2S – ^2P^o$	1/2 – 3/2	I1
	1	4001.376	4001.371	170 637.35	–	195 621.72	5s – 6p	$^2S – ^2P^o$	1/2 – 1/2	I1
	5	4082.450	4082.452	178 433.43	–	202 921.60	5p – 7s	$^2P^o – ^2S$	1/2 – 1/2	I1
	6	4088.611	4088.611	178 470.32	–	202 921.60	5p – 7s	$^2P^o – ^2S$	3/2 – 1/2	I1
16	5d	4142.37	4142.343	189 876.10	–	214 010.22	5f – 8g	$^2F^o – ^2G$	5/2 – 7/2	I1
16			4142.398	189 876.42	–	214 010.22	5f – 8g	$^2F^o – ^2G$	7/2 – 9/2	
5	12	4149.915	4149.913	165 786.32	–	189 876.42	4d – 5f	$^2D – ^2F^o$	5/2 – 7/2	I1
5	12	4150.173	4150.173	165 787.51	–	189 876.10	4d – 5f	$^2D – ^2F^o$	3/2 – 5/2	I1
	bl	4150.91	4150.888	189 928.49	–	214 012.93	5g – 8h	$^2G – ^2H^o$	7/2 – 9/2	I1
			4150.920	189 928.68	–	214 012.93	5g – 8h	$^2G – ^2H^o$	9/2 –	
			4153.897	189 928.49	–	213 995.48	5g – 8f	$^2G – ^2F^o$	7/2 – 5/2	
			4153.930	189 928.68	–	213 995.48	5g – 8f	$^2G – ^2F^o$	9/2 – 7/2	
15	bl	4189.73	4189.70	189 876.10	–	213 737.44	5f – 8d	$^2F^o – ^2D$	5/2 –	I1
15			4189.75	189 876.42	–	213 737.44	5f – 8d	$^2F^o – ^2D$	7/2 – 5/2	
9	4d	4357.562	4357.568	178 433.43	–	201 375.56	5p – 6d	$^2P^o – ^2D$	1/2 – 3/2	I1
9	5d	4364.642	4364.655	178 470.32	–	201 375.20	5p – 6d	$^2P^o – ^2D$	3/2 – 5/2	I1
8	12	4479.892	4479.885	167 612.75	–	189 928.49	4f – 5g	$^2F^o – ^2G$	5/2 – 7/2	I1
8	12	4479.968	4479.971	167 613.37	–	189 928.68	4f – 5g	$^2F^o – ^2G$	7/2 – 9/2	I1
3	13	4512.564	4512.565	143 633.38	–	165 787.51	4p – 4d	$^2P^o – ^2D$	1/2 – 3/2	I1
3	11	4528.942	4528.944	143 713.50	–	165 787.51	4p – 4d	$^2P^o – ^2D$	3/2 – 3/2	I1
3	14	4529.194	4529.188	143 713.50	–	165 786.32	4p – 4d	$^2P^o – ^2D$	3/2 – 5/2	I1
6	5	4701.148	4701.144	167 612.75	–	188 878.22	4f – 5d	$^2F^o – ^2D$	5/2 – 3/2	I1
6	6	4701.412	4701.424	167 613.37	–	188 877.57	4f – 5d	$^2F^o – ^2D$	7/2 – 5/2	I1
11	5d	4904.10	4904.03	188 877.57	–	209 263.25	5d – 7f	$^2D – ^2F^o$	5/2 – 7/2	I1
11			4904.19	188 878.22	–	209 263.25	5d – 7f	$^2D – ^2F^o$	3/2 – 5/2	
14	5d	5151.01	5150.97	189 876.10	–	209 284.53	5f – 7g	$^2F^o – ^2G$	5/2 – 7/2	I1
14			5151.05	189 876.42	–	209 284.53	5f – 7g	$^2F^o – ^2G$	7/2 – 9/2	

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Air Wavelength (Å) Calculated	Levels (cm^{-1}) Lower	Levels (cm^{-1}) Upper	Configurations	Terms	J Values	Ref.
19	5*d*	5163.89	5163.86	189 928.49	209 288.46	5*g* – 7*h*	^{2}G – ^{2}H°	7/2 – 9/2	I1
19			5163.91	189 928.68	209 288.46	5*g* – 7*h*	^{2}G – ^{2}H°	9/2 – 11/2	
18	1*d*	5170.60	5170.59	189 928.49	209 263.25	5*g* – 7*f*	^{2}G – ^{2}F°		I1
13	3*d*	5260.11	5260.11	189 876.10	208 881.83	5*f* – 7*d*	^{2}F° – ^{2}D		I1
2	17	5696.603	5696.604	126 164.05	143 713.50	4*s* – 4*p*	^{2}S – ^{2}P°	1/2 – 3/2	I1
2	16	5722.728	5722.730	126 164.05	143 633.38	4*s* – 4*p*	^{2}S – ^{2}P°	1/2 – 1/2	I1
	5	6055.21	6055.19	188 877.57	205 387.77	5*d* – 7*p*	^{2}D – ^{2}P°	5/2 – 3/2	I1
	4	6059.84	6059.84	188 878.22	205 375.74	5*d* – 7*p*	^{2}D – ^{2}P°	3/2 – 1/2	I1
	2*d*	6301.85	6301.79	201 375.20	217 239.31	6*d* – 9*f*	^{2}D – ^{2}F°	5/2 – 7/2	I1
			6301.94	201 375.56	217 239.31	6*d* – 9*f*	^{2}D – ^{2}F°	3/2 – 5/2	
	2*d*	6543.12	6543.12	201 971.16	217 250.17	6*f* – 9*g*	^{2}F° – ^{2}G		I1
	2*d*	6556.18	6556.18	202 003.58	217 252.15	6*g* – 9*h*	^{2}G – ^{2}H°		I1
	7*d*	7635.37	7635.22	188 877.57	201 971.16	5*d* – 6*f*	^{2}D – ^{2}F°	5/2 – 7/2	I1
			7635.60	188 878.22	201 971.16	5*d* – 6*f*	^{2}D – ^{2}F°	3/2 – 5/2	
	6	7660.259	7660.257	178 433.43	191 484.23	5*p* – 6*s*	^{2}P° – ^{2}S	1/2 – 1/2	I1
	7	7681.971	7681.971	178 470.32	191 484.23	5*p* – 6*s*	^{2}P° – ^{2}S	3/2 – 1/2	I1
	9	7881.790	7881.780	165 786.32	178 470.32	4*d* – 5*p*	^{2}D – ^{2}P°	5/2 – 3/2	I1
	6	7882.516	7882.520	165 787.51	178 470.32	4*d* – 5*p*	^{2}D – ^{2}P°	3/2 – 3/2	I1
	8	7905.513	7905.514	165 787.51	178 433.43	4*d* – 5*p*	^{2}D – ^{2}P°	3/2 – 1/2	I1
	2*d*	7921.66	7921.57	201 375.20	213 995.48	6*d* – 8*f*	^{2}D – ^{2}F°	5/2 – 7/2	I1
			7921.80	201 375.56	213 995.48	6*d* – 8*f*	^{2}D – ^{2}F°	3/2 – 5/2	
	8*d*	8243.59	8243.47	189 876.10	202 003.58	5*f* – 6*g*	^{2}F° – ^{2}G	5/2 – 7/2	I1
			8243.69	189 876.42	202 003.58	5*f* – 6*g*	^{2}F° – ^{2}G	7/2 – 9/2	
	9*d*	8275.11	8275.03	189 928.49	202 009.71	5*g* – 6*h*	^{2}G – ^{2}H°	7/2 – 9/2	I1
			8275.16	189 928.68	202 009.71	5*g* – 6*h*	^{2}G – ^{2}H°	9/2 – 11/2	
	3*d*	8301.62	8301.65	189 928.68	201 971.16	5*g* – 6*f*	^{2}G – ^{2}F°	9/2 – 7/2	I1
	2*d*	8304.02	8304.01	201 971.16	214 010.22	6*f* – 8*g*	^{2}F° – ^{2}G		I1
	2*d*	8324.56	8324.56	202 003.58	214 012.93	6*g* – 8*h*	^{2}G – ^{2}H°		I1
	4*d*	8693.98	8693.95	189 876.10	201 375.20	5*f* – 6*d*	^{2}F° – ^{2}D	5/2 – 5/2	I1
			8694.19	189 876.42	201 375.20	5*f* – 6*d*	^{2}F° – ^{2}D	7/2 – 5/2	
	8	9571.52	9571.53	178 433.43	188 878.22	5*p* – 5*d*	^{2}P° – ^{2}D	1/2 – 3/2	I1
	9	9605.99	9606.05	178 470.32	188 877.57	5*p* – 5*d*	^{2}P° – ^{2}D	3/2 – 5/2	I1

Al IV

Ne I isoelectronic sequence

Ground state $1s^22s^22p^6\ ^1S_0$

Ionization energy $967\,804 \pm 15$ cm^{-1} (119.992 ± 0.002 eV)

The best measurements of transitions to the ground level ($\lambda < 162$ Å) are probably accurate to about ± 0.004 Å [K2]. Two-place experimental wavelengths are given for the 476–766 Å region; the calculated wavelengths in this region should generally be more accurate, with errors mainly in the range 0.002 to 0.006 Å. Most of the wavelengths above 800 Å have estimated errors of 0.005 to 0.01 Å [K2, A1].

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Al IV

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	g	78.79	78.79	0 –	1 269 200	$2s^22p^6 - 2s(^2S)2p^66p$	$^1S - ^1P^o$	0 – 1	K3
	g	80.58	80.58	0 –	1 241 000	$2s^22p^6 - 2s(^2S)2p^65p$	$^1S - ^1P^o$	0 – 1	K3
	g	84.38	84.38	0 –	1 185 100	$2s^22p^6 - 2s(^2S)2p^64p$	$^1S - ^1P^o$	0 – 1	K3
	g	84.48	84.48	0 –	1 183 700	$2s^22p^6 - 2s(^2S)2p^64p$	$^1S - ^3P^o$	0 – 1	K3
	g	95.56	95.56	0 –	1 046 500	$2s^22p^6 - 2s(^2S)2p^63p$	$^1S - ^1P^o$	0 – 1	K3
	g	95.68	95.68	0 –	1 045 200	$2s^22p^6 - 2s(^2S)2p^63p$	$^1S - ^3P^o$	0 – 1	K3
	1*g,d*	104.89	104.89	0 –	953 380	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})10d$	$^1S - ^2[^3/_2]^o$	0 – 1	M1
	2*g,d*	105.26	105.26	0 –	950 030	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})10d$	$^1S - ^2[^3/_2]^o$	0 – 1	M1
	3*g*	105.35	105.35	0 –	949 220	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})9d$	$^1S - ^2[^3/_2]^o$	0 – 1	M1
	4*g*	105.72	105.72	0 –	945 900	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})9d$	$^1S - ^2[^3/_2]^o$	0 – 1	M1
	3*g*	106.01	106.01	0 –	943 300	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})8d$	$^1S - ^2[^3/_2]^o$	0 – 1	M1
	5*g*	106.38	106.38	0 –	940 020	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})8d$	$^1S - ^2[^3/_2]^o$	0 – 1	M1
	g	106.99	106.99	0 –	934 670	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})7d$	$^1S - ^2[^3/_2]^o$	0 – 1	J2
	g	107.37	107.37	0 –	931 360	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})7d$	$^1S - ^2[^3/_2]^o$	0 – 1	J2
	50*g*	108.526	108.526	0 –	921 440	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})6d$	$^1S - ^2[^3/_2]^o$	0 – 1	J2
	50*g*	108.913	108.913	0 –	918 160	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})6d$	$^1S - ^2[^3/_2]^o$	0 – 1	J2
	g	109.021	109.022	0 –	917 250	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})6d$	$^1S - ^2[^1/_2]^o$	0 – 1	J2
	1*g*	110.13	110.13	0 –	908 020	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})6s$	$^1S - ^2[^1/_2]^o$	0 – 1	M1
	2*g*	110.54	110.54	0 –	904 650	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})6s$	$^1S - ^2[^3/_2]^o$	0 – 1	M1
	100*g*	111.196	111.196	0 –	899 310	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})5d$	$^1S - ^2[^3/_2]^o$	0 – 1	J2
	150*g*	111.589	111.590	0 –	896 140	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})5d$	$^1S - ^2[^3/_2]^o$	0 – 1	J2
	50*g*	111.781	111.781	0 –	894 610	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})5d$	$^1S - ^2[^1/_2]^o$	0 – 1	J2
	10*g*	114.313	114.317	0 –	874 756.8	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})5s$	$^1S - ^2[^1/_2]^o$	0 – 1	F2
	50*g*	114.737	114.743	0 –	871 512.2	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})5s$	$^1S - ^2[^3/_2]^o$	0 – 1	F2
	250*g*	116.464	116.463	0 –	858 642.0	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})4d$	$^1S - ^2[^3/_2]^o$	0 – 1	J2
	150*g*	116.921	116.922	0 –	855 272.7	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})4d$	$^1S - ^2[^3/_2]^o$	0 – 1	J2
	10*g*	117.377	117.370	0 –	852 007.5	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})4d$	$^1S - ^2[^1/_2]^o$	0 – 1	S3
	400*g*	124.030	124.033	0 –	806 234.9	$2s^22p^6 - 2s^22p^5(^2P^o_{1/2})4s$	$^1S - ^2[^1/_2]^o$	0 – 1	K2
	300*g*	124.550	124.547	0 –	802 907.5	$2s^22p^6 - 2s^22p^5(^2P^o_{3/2})4s$	$^1S - ^2[^3/_2]^o$	0 – 1	K2
	700*g*	129.730	129.729	0 –	770 836.9	$2s^22p^6 - 2s^22p^5(^2P^o)3d$	$^1S - ^1P^o$	0 – 1	K2
	g,bl	130.39	130.398	0 –	766 880.8	$2s^22p^6 - 2s^22p^5(^2P^o)3d$	$^1S - ^3D^o$	0 – 1	K2
	150*g*	131.647	131.649	0 –	759 596.8	$2s^22p^6 - 2s^22p^5(^2P^o)3d$	$^1S - ^3P^o$	0 – 1	K2
	800*g*	160.074	160.072	0 –	624 717.5	$2s^22p^6 - 2s^22p^5(^2P^o)3s$	$^1S - ^1P^o$	0 – 1	K2
	700*g*	161.688	161.688	0 –	618 473.9	$2s^22p^6 - 2s^22p^5(^2P^o)3s$	$^1S - ^3P^o$	0 – 1	K2
	5	476.13	476.134	618 473.9 –	828 498.8	$2s^22p^5(^2P^o)3s - 2s^22p^5(^2P^o_{1/2})4p$	$^3P^o - ^2[^1/_2]$	1 – 1	A1

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm⁻¹) Lower	Upper	Configurations	Terms	J Values	Ref.
	20	476.27	476.269	618 473.9 –	828 439.2	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3P^\circ - ^2[3/2]$	1 – 2	A1
	5	477.60	477.621	618 473.9 –	827 844.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3P^\circ - ^2[3/2]$	1 – 1	A1
	10	477.73	477.725	618 473.9 –	827 799.5	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[1/2]$	1 – 0	A1
	30	478.26	478.251	616 644.2 –	825 739.6	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[3/2]$	2 – 2	A1
	5	479.30	479.309	616 644.2 –	825 277.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[3/2]$	2 – 1	A1
	20	479.76	479.757	620 060.1 –	828 498.8	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3P^\circ - ^2[1/2]$	0 – 1	A1
	30	481.01	480.999	616 644.2 –	824 544.7	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[5/2]$	2 – 2	A1
	10	481.29	481.267	620 060.1 –	827 844.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3P^\circ - ^2[3/2]$	0 – 1	A1
	100	482.08	482.077	616 644.2 –	824 080.0	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[5/2]$	2 – 3	A1
	10	482.48	482.473	618 473.9 –	825 739.6	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[3/2]$	1 – 2	A1
	20	483.55	483.550	618 473.9 –	825 277.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[3/2]$	1 – 1	A1
	40	485.28	485.270	618 473.9 –	824 544.7	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[5/2]$	1 – 2	A1
	100	488.36	488.365	616 644.2 –	821 408.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[1/2]$	2 – 1	A1
	20	490.73	490.722	624 717.5 –	828 498.8	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{1/2})4p$	$^1P^\circ - ^2[1/2]$	1 – 1	A1
	40	490.88	490.866	624 717.5 –	828 439.2	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{1/2})4p$	$^1P^\circ - ^2[3/2]$	1 – 2	A1
	20	492.31	{492.302	624 717.5 –	827 844.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{1/2})4p$	$^1P^\circ - ^2[3/2]$	1 – 1	A1
			492.309	671 632.5 –	874 756.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^3S - ^2[1/2]^\circ$	1 – 1	
	25	492.78	492.769	618 473.9 –	821 408.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[1/2]$	1 – 1	A1
	10	496.66	496.651	620 060.1 –	821 408.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[1/2]$	0 – 1	A1
	15	497.47	497.458	624 717.5 –	825 739.6	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^1P^\circ - ^2[3/2]$	1 – 2	A1
	5	498.61	498.603	624 717.5 –	825 277.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^1P^\circ - ^2[3/2]$	1 – 1	A1
	30	500.29	500.301	671 632.5 –	871 512.2	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^3S - ^2[3/2]^\circ$	1 – 1	A1
	10	500.42	500.432	624 717.5 –	824 544.7	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ_{3/2})4p$	$^1P^\circ - ^2[5/2]$	1 – 2	A1
	5	501.62	501.607	671 632.5 –	870 991.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^3S - ^2[3/2]^\circ$	1 – 2	A1
	20	525.95	525.950	680 859.8 –	870 991.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^3D - ^2[3/2]^\circ$	3 – 2	A1
	5	526.81	526.790	681 683.3 –	871 512.2	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^3D - ^2[3/2]^\circ$	2 – 1	A1
	5	528.26	528.238	681 683.3 –	870 991.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^3D - ^2[3/2]^\circ$	2 – 2	A1
	2	530.42	530.418	682 981.8 –	871 512.2	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^3D - ^2[3/2]^\circ$	1 – 1	A1
	1	532.49	532.488	686 959.1 –	874 756.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^1P - ^2[1/2]^\circ$	1 – 1	A1
	15	534.98	534.970	687 830.5 –	874 756.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^3P - ^2[1/2]^\circ$	2 – 1	A1
	3	536.36	536.345	688 309.6 –	874 756.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^3P - ^2[1/2]^\circ$	0 – 1	A1
	5	537.34	537.324	688 649.4 –	874 756.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^3P - ^2[1/2]^\circ$	1 – 1	A1
	5	541.86	541.849	686 959.1 –	871 512.2	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^1P - ^2[3/2]^\circ$	1 – 1	A1
	10	545.97	545.967	687 830.5 –	870 991.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^3P - ^2[3/2]^\circ$	2 – 2	A1
	15	552.67	552.675	671 632.5 –	852 570.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^3S - ^2[3/2]^\circ$	1 – 2	A1
	20	571.61	571.616	681 683.3 –	856 625.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^3D - ^2[5/2]^\circ$	2 – 2	A1
	20	575.89	575.891	682 981.8 –	856 625.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^3D - ^2[5/2]^\circ$	1 – 2	A1
	10	577.66	577.662	680 859.8 –	853 971.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^3D - ^2[5/2]^\circ$	3 – 3	A1
	5	578.32	578.323	685 728.2 –	858 642.0	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^1D - ^2[3/2]^\circ$	2 – 1	A1
	40	580.41	{580.414	682 981.8 –	855 272.7	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^3D - ^2[3/2]^\circ$	1 – 1	A1
			580.423	681 683.3 –	853 971.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^3D - ^2[5/2]^\circ$	2 – 3	
	10	581.18	581.172	681 683.3 –	853 749.4	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^3D - ^2[5/2]^\circ$	2 – 2	A1
	100	581.91	581.913	680 859.8 –	852 706.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^3D - ^2[7/2]^\circ$	3 – 4	A1
	70	583.59	583.581	681 683.3 –	853 039.1	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^3D - ^2[7/2]^\circ$	2 – 3	A1
	2	584.43	584.403	685 728.2 –	856 843.1	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^1D - ^2[3/2]^\circ$	2 – 2	A1
	5	585.13	585.146	685 728.2 –	856 625.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^1D - ^2[5/2]^\circ$	2 – 2	A1
	3	585.44	585.441	687 830.5 –	858 642.0	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^3P - ^2[3/2]^\circ$	2 – 1	A1
	5	587.11	587.116	681 683.3 –	852 007.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^3D - ^2[1/2]^\circ$	2 – 1	A1
	20	589.39	589.391	686 959.1 –	856 625.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^1P - ^2[5/2]^\circ$	1 – 2	A1
	60	591.62	{591.613	687 830.5 –	856 859.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^3P - ^2[5/2]^\circ$	2 – 3	A1
			591.626	682 981.8 –	852 007.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^3D - ^2[1/2]^\circ$	1 – 1	

Al IV — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
	2	592.42	592.434	687 830.5	–	856 625.8	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4d$	$^3P - ^2[5/2]^o$	2 – 2	A1
	40	594.38	594.377	685 728.2	–	853 971.5	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4d$	$^1D - ^2[5/2]^o$	2 – 3	A1
	30	594.55	594.553	688 649.4	–	856 843.1	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4d$	$^3P - ^2[3/2]^o$	1 – 2	A1
	10	598.95	598.935	688 309.6	–	855 272.7	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4d$	$^3P - ^2[3/2]^o$	0 – 1	A1
	2	603.83	603.823	686 959.1	–	852 570.5	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4d$	$^1P - ^2[3/2]^o$	1 – 2	A1
	10	607.04	607.017	687 830.5	–	852 570.5	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4d$	$^3P - ^2[3/2]^o$	2 – 2	A1
	1	635.31	635.262	714 096.9	–	871 512.2	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})5s$	$^1S - ^2[3/2]^o$	0 – 1	A1
	30	691.82	691.826	714 096.9	–	858 642.0	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4d$	$^1S - ^2[3/2]^o$	0 – 1	A1
	10	708.34	708.337	714 096.9	–	855 272.7	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4d$	$^1S - ^2[3/2]^o$	0 – 1	A1
	10	712.43	712.430	760 472.3	–	900 836.9	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3P^o - ^2[5/2]$	2 – 3	A1
	7	724.62	724.618	759 193.4	–	897 197.1	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3P^o - ^2[3/2]$	0 – 1	A1
	30	726.63	726.634	759 596.8	–	897 217.6	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3P^o - ^2[3/2]$	1 – 2	A1
	60	728.71	728.704	763 613.6	–	900 843.6	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[7/2]$	2 – 3	A1
	60	730.22	730.223	760 472.3	–	897 416.8	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3P^o - ^2[5/2]$	2 – 3	A1
	3	732.35	{732.329	764 297.1	–	900 847.7	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^1F^o - ^2[7/2]$	3 – 4	A1
			{732.351	764 297.1	–	900 843.6	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^1F^o - ^2[7/2]$	3 – 3	
	5	736.11	{736.097	761 688.4	–	897 540.1	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[7/2]$	4 – 4	A1
			{736.111	761 688.4	–	897 537.5	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[7/2]$	4 – 3	
	200	737.27	737.266	761 688.4	–	897 324.7	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[9/2]$	4 – 5	A1
	5	739.31	{739.275	762 272.5	–	897 540.1	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[7/2]$	3 – 4	A1
			{739.290	762 272.5	–	897 537.5	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[7/2]$	3 – 3	
	5	739.93	739.950	762 272.5	–	897 416.8	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[5/2]$	3 – 3	A1
	100	740.44	740.434	762 272.5	–	897 328.4	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[9/2]$	3 – 4	A1
	20	742.947	742.929	671 632.5	–	806 234.9	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^3S - ^2[1/2]^o$	1 – 1	K2
	5	746.43	746.417	766 880.8	–	900 854.1	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3D^o - ^2[5/2]$	1 – 2	A1
	20	746.71	746.693	763 613.6	–	897 537.5	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[7/2]$	2 – 3	A1
	40	747.35	{747.340	767 035.7	–	900 843.6	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^1D^o - ^2[7/2]$	2 – 3	A1
			{747.366	763 613.6	–	897 416.8	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[5/2]$	2 – 3	
	2	748.63	748.595	763 613.6	–	897 197.1	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3F^o - ^2[3/2]$	2 – 1	A1
	60	749.07	{749.051	767 345.5	–	900 847.7	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3D^o - ^2[7/2]$	3 – 4	A1
			{749.074	767 345.5	–	900 843.6	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3D^o - ^2[7/2]$	3 – 3	
	40	750.52	{750.508	764 297.1	–	897 540.1	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^1F^o - ^2[7/2]$	3 – 4	A1
			{750.523	764 297.1	–	897 537.5	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^1F^o - ^2[7/2]$	3 – 3	
	40	751.41	751.392	767 750.6	–	900 836.9	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3D^o - ^2[5/2]$	2 – 3	A1
	2	751.68	751.703	764 297.1	–	897 328.4	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^1F^o - ^2[9/2]$	3 – 4	A1
	m		761.760	671 632.5	–	802 907.5	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4s$	$^3S - ^2[3/2]^o$	1 – 1	K2
	6	765.97	765.961	766 880.8	–	897 435.7	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^3D^o - ^2[5/2]$	1 – 2	A1
	3	766.31	766.273	767 035.7	–	897 537.5	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^1D^o - ^2[7/2]$	2 – 3	A1
	100	767.747	767.755	671 632.5	–	801 882.3	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4s$	$^3S - ^2[3/2]^o$	1 – 2	K2
	10	769.13	769.129	770 836.9	–	900 854.1	$2s^22p^5(^2P^o)3d - 2s^22p^5(^2P^o_{3/2})5f$	$^1P^o - ^2[5/2]$	1 – 2	A1
	10	802.875	802.880	681 683.3	–	806 234.9	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^3D - ^2[1/2]^o$	2 – 1	K2
	1	811.341	811.339	682 981.8	–	806 234.9	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^3D - ^2[1/2]^o$	1 – 1	K2
	50	817.473	817.475	682 981.8	–	805 309.7	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^3D - ^2[1/2]^o$	1 – 0	K2
	150	824.911	824.918	681 683.3	–	802 907.5	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4s$	$^3D - ^2[3/2]^o$	2 – 1	K2
	200	826.287	826.293	680 859.8	–	801 882.3	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4s$	$^3D - ^2[3/2]^o$	3 – 2	K2
	50	829.830	829.829	685 728.2	–	806 234.9	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^1D - ^2[1/2]^o$	2 – 1	K2
	10	831.939	831.954	681 683.3	–	801 882.3	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4s$	$^3D - ^2[3/2]^o$	2 – 2	K2
	30	838.398	838.393	686 959.1	–	806 234.9	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^1P - ^2[1/2]^o$	1 – 1	K2
	1	841.050	841.039	682 981.8	–	801 882.3	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4s$	$^3D - ^2[3/2]^o$	1 – 2	K2
	200	844.564	844.563	687 830.5	–	806 234.9	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^3P - ^2[1/2]^o$	2 – 1	K2
	50	844.949	844.947	686 959.1	–	805 309.7	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^1P - ^2[1/2]^o$	1 – 0	K2
	10	847.995	847.994	688 309.6	–	806 234.9	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^3P - ^2[1/2]^o$	0 – 1	K2
	80	850.447	850.445	688 649.4	–	806 234.9	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^3P - ^2[1/2]^o$	1 – 1	K2
	100	853.393	853.393	685 728.2	–	802 907.5	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4s$	$^1D - ^2[3/2]^o$	2 – 1	K2
	50	857.198	857.190	688 649.4	–	805 309.7	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{1/2})4s$	$^3P - ^2[1/2]^o$	1 – 0	K2
	150	860.937	860.925	685 728.2	–	801 882.3	$2s^22p^5(^2P^o)3p - 2s^22p^5(^2P^o_{3/2})4s$	$^1D - ^2[3/2]^o$	2 – 2	K2

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm⁻¹) Lower		Upper	Configurations	Terms	J Values	Ref.
	10	862.455	862.453	686 959.1	–	802 907.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4s$	$^1P - ^2[^3/_2]^\circ$	1 – 1	K2
	1	868.994	868.983	687 830.5	–	802 907.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4s$	$^3P - ^2[^3/_2]^\circ$	2 – 1	K2
	5	870.154	870.146	686 959.1	–	801 882.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4s$	$^1P - ^2[^3/_2]^\circ$	1 – 2	K2
	20	872.626	872.616	688 309.6	–	802 907.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4s$	$^3P - ^2[^3/_2]^\circ$	0 – 1	K2
	80	876.803	876.795	687 830.5	–	801 882.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4s$	$^3P - ^2[^3/_2]^\circ$	2 – 2	K2
	50	883.138	883.136	688 649.4	–	801 882.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4s$	$^3P - ^2[^3/_2]^\circ$	1 – 2	K2
	30	1017.940	1017.933	759 596.8	–	857 835.1	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3P^\circ - ^2[^5/_2]$	1 – 2	A1
	100	1018.168	1018.162	759 193.4	–	857 409.6	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3P^\circ - ^2[^3/_2]$	0 – 1	A1
	200	1022.082	1022.078	759 596.8	–	857 436.7	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3P^\circ - ^2[^3/_2]$	1 – 2	A1
	100	1022.362	1022.361	759 596.8	–	857 409.6	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3P^\circ - ^2[^3/_2]$	1 – 1	A1
	5	1023.93	1023.948	763 613.6	–	861 274.8	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4f$	$^3F^\circ - ^2[^5/_2]$	2 – 2	A1
	150	1024.248	1024.241	763 613.6	–	861 246.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4f$	$^3F^\circ - ^2[^7/_2]$	2 – 3	A1
	5	1027.08	1027.086	760 472.3	–	857 835.1	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3P^\circ - ^2[^5/_2]$	2 – 2	A1
	500	1027.343	1027.346	760 472.3	–	857 810.5	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3P^\circ - ^2[^5/_2]$	2 – 3	A1
	100	1031.39	1031.403	764 297.1	–	861 252.4	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4f$	$^1F^\circ - ^2[^7/_2]$	3 – 4	A1
	30	1040.340	1040.344	761 688.4	–	857 810.5	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3F^\circ - ^2[^5/_2]$	4 – 3	A1
	800	1042.169	1042.163	761 688.4	–	857 642.7	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3F^\circ - ^2[^9/_2]$	4 – 5	A1
	200	1044.064	1044.071	762 272.5	–	858 051.4	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3F^\circ - ^2[^7/_2]$	3 – 3	A1
	200	1045.766	1045.774	618 473.9	–	714 096.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^1S$	1 – 0	K2
	700	1048.515	1048.510	762 272.5	–	857 645.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3F^\circ - ^2[^9/_2]$	3 – 4	A1
	500	1058.901	1058.898	763 613.6	–	858 051.4	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3F^\circ - ^2[^7/_2]$	2 – 3	A1
	150	1059.396	1059.389	766 880.8	–	861 274.8	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4f$	$^3D^\circ - ^2[^5/_2]$	1 – 2	A1
	40	1061.135	1061.131	767 035.7	–	861 274.8	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4f$	$^1D^\circ - ^2[^5/_2]$	2 – 2	A1
	500	1061.429	1061.445	767 035.7	–	861 246.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4f$	$^1D^\circ - ^2[^7/_2]$	2 – 3	A1
	600	1064.891	1064.885	767 345.5	–	861 252.4	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4f$	$^3D^\circ - ^2[^7/_2]$	3 – 4	A1
	500	1066.567	1066.570	764 297.1	–	858 055.6	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^1F^\circ - ^2[^7/_2]$	3 – 4	A1
	600	1069.437	1069.438	767 750.6	–	861 257.7	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4f$	$^3D^\circ - ^2[^5/_2]$	2 – 3	A1
	100	1071.241	1071.251	764 297.1	–	857 645.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^1F^\circ - ^2[^9/_2]$	3 – 4	A1
	5	1085.331	1085.328	714 096.9	–	806 234.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{1/2})4s$	$^1S - ^2[^1/_2]^\circ$	0 – 1	K2
	200	1098.718	1098.712	767 035.7	–	858 051.4	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^1D^\circ - ^2[^7/_2]$	2 – 3	A1
	300	1099.461	1099.453	766 880.8	–	857 835.1	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3D^\circ - ^2[^5/_2]$	2 – 2	A1
	20	1101.34	1101.329	767 035.7	–	857 835.1	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^1D^\circ - ^2[^5/_2]$	2 – 2	A1
	200	1102.417	1102.413	767 345.5	–	858 055.6	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3D^\circ - ^2[^7/_2]$	3 – 4	A1
	70	1104.285	1104.290	766 880.8	–	857 436.7	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3D^\circ - ^2[^3/_2]$	1 – 2	A1
	20	1104.617	1104.621	766 880.8	–	857 409.6	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3D^\circ - ^2[^3/_2]$	1 – 1	A1
	50	1105.402	1105.400	767 345.5	–	857 810.5	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^3D^\circ - ^2[^5/_2]$	3 – 3	A1
	400	1105.738	1105.731	770 836.9	–	861 274.8	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4f$	$^1P^\circ - ^2[^5/_2]$	1 – 2	A1
	600	1118.824	1118.826	624 717.5	–	714 096.9	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^1P^\circ - ^1S$	1 – 0	K2
	500	1125.613	1125.622	671 632.5	–	760 472.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3S - ^3P^\circ$	1 – 2	K2
	5	1126.001	1125.992	714 096.9	–	802 907.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ_{3/2})4s$	$^1S - ^2[^3/_2]^\circ$	0 – 1	K2
	400	1136.821	1136.825	671 632.5	–	759 596.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3S - ^3P^\circ$	1 – 1	K2
	200	1142.058	1142.062	671 632.5	–	759 193.4	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3S - ^3P^\circ$	1 – 0	K2
	200	1149.450	1149.449	770 836.9	–	857 835.1	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^1P^\circ - ^2[^5/_2]$	1 – 2	A1
	m		1150.870	680 859.8	–	767 750.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3D^\circ$	3 – 2	K2
	250	1154.730	1154.737	770 836.9	–	857 436.7	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4f$	$^1P^\circ - ^2[^3/_2]$	1 – 2	A1
	150	1156.263	1156.260	680 859.8	–	767 345.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3D^\circ$	3 – 3	K2
	1	1160.32	1160.417	680 859.8	–	767 035.7	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^1D^\circ$	3 – 2	K2
	300	1161.885	1161.881	681 683.3	–	767 750.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3D^\circ$	2 – 2	K2
	150	1167.39	1167.376	681 683.3	–	767 345.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3D^\circ$	2 – 3	K2
	5	1171.59	1171.613	681 683.3	–	767 035.7	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^1D^\circ$	2 – 2	K2
	m		1174.967	685 728.2	–	770 836.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1D - ^1P^\circ$	2 – 1	K2
	20	1179.666	1179.679	682 981.8	–	767 750.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3D^\circ$	1 – 2	K2
	50	1189.711	1189.713	682 981.8	–	767 035.7	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^1D^\circ$	1 – 2	K2
	200	1191.907	1191.909	682 981.8	–	766 880.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3D^\circ$	1 – 1	K2
	150	1192.212	1192.211	686 959.1	–	770 836.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1P - ^1P^\circ$	1 – 1	K2

Al IV — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
	400	1198.500	1198.505	680 859.8	–	764 297.1	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^1F^\circ$	3 – 3	K2
	1	1204.722	1204.726	687 830.5	–	770 836.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^1P^\circ$	2 – 1	K2
	10	1208.401	1208.404	680 859.8	–	763 613.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3F^\circ$	3 – 2	K2
	40	1211.724	1211.720	688 309.6	–	770 836.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^1P^\circ$	0 – 1	K2
	300	1216.723	1216.730	688 649.4	–	770 836.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^1P^\circ$	1 – 1	K2
	300	1219.171	1219.179	685 728.2	–	767 750.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1D - ^3D^\circ$	2 – 2	K2
	400	1220.546	1220.550	681 683.3	–	763 613.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3F^\circ$	2 – 2	K2
	10	1225.236	1225.230	685 728.2	–	767 345.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1D - ^3D^\circ$	2 – 3	K2
	300	1228.310	1228.310	680 859.8	–	762 272.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3F^\circ$	3 – 3	K2
	40	1229.908	1229.899	685 728.2	–	767 035.7	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1D - ^1D^\circ$	2 – 2	K2
	900	1237.187	1237.186	680 859.8	–	761 688.4	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3F^\circ$	3 – 4	K2
	10	1237.744	1237.754	686 959.1	–	767 750.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1P - ^3D^\circ$	1 – 2	K2
	600	1240.206	1240.205	682 981.8	–	763 613.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3F^\circ$	1 – 2	K2
	700	1240.861	1240.861	681 683.3	–	762 272.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3F^\circ$	2 – 3	K2
	700	1248.790	1248.804	686 959.1	–	767 035.7	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1P - ^1D^\circ$	1 – 2	K2
	150	1251.235	{ 1251.225	686 959.1	–	766 880.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1P - ^3D^\circ$	1 – 1	K2
			{ 1251.250	687 830.5	–	767 750.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3D^\circ$	2 – 2	
	40	1256.083	1256.084	680 859.8	–	760 472.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3P^\circ$	3 – 2	K2
	900	1257.624	1257.624	687 830.5	–	767 345.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3D^\circ$	2 – 3	K2
	300	1262.544	1262.543	687 830.5	–	767 035.7	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^1D^\circ$	2 – 2	K2
	800	1264.181	1264.203	688 649.4	–	767 750.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3D^\circ$	1 – 2	K2
	20	1269.209	1269.213	681 683.3	–	760 472.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3P^\circ$	2 – 2	K2
	1000	1272.763	1272.768	685 728.2	–	764 297.1	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1D - ^1F^\circ$	2 – 3	K2
	5	1275.731	1275.733	688 649.4	–	767 035.7	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^1D^\circ$	1 – 2	K2
	50	1278.265	1278.259	688 649.4	–	766 880.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3D^\circ$	1 – 1	K2
	40	1283.484	1283.475	681 683.3	–	759 596.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3P^\circ$	2 – 1	K2
	20	1290.486	1290.481	682 981.8	–	760 472.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3P^\circ$	1 – 2	K2
	30	1304.547	1304.555	686 959.1	–	763 613.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1P - ^3F^\circ$	1 – 2	K2
	1	1305.21	1305.227	682 981.8	–	759 596.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3P^\circ$	1 – 1	K2
	200	1306.432	1306.433	685 728.2	–	762 272.5	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1D - ^3F^\circ$	2 – 3	K2
	60	1307.762	1307.760	687 830.5	–	764 297.1	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^1F^\circ$	2 – 3	K2
	20	1312.135	1312.136	682 981.8	–	759 193.4	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3D - ^3P^\circ$	1 – 0	K2
	1	1319.57	1319.555	687 830.5	–	763 613.6	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3F^\circ$	2 – 2	K2
	400	1337.898	1337.898	685 728.2	–	760 472.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1D - ^3P^\circ$	2 – 2	K2
	150	1353.745	1353.755	685 728.2	–	759 596.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1D - ^3P^\circ$	2 – 1	K2
	100	1360.298	1360.300	686 959.1	–	760 472.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1P - ^3P^\circ$	1 – 2	K2
	500	1376.618	1376.618	687 830.5	–	760 472.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3P^\circ$	2 – 2	K2
	500	1388.789	1388.789	616 644.2	–	688 649.4	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3P$	2 – 1	K2
	40	1392.33	1392.314	688 649.4	–	760 472.3	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3P^\circ$	1 – 2	K2
	60	1393.42	1393.412	687 830.5	–	759 596.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3P^\circ$	2 – 1	K2
	m		1402.776	688 309.6	–	759 596.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3P^\circ$	0 – 1	K2
	300	1404.751	1404.765	616 644.2	–	687 830.5	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3P$	2 – 2	K2
	100	1409.490	1409.495	688 649.4	–	759 596.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3P^\circ$	1 – 1	K2
	100	1417.558	1417.555	688 649.4	–	759 193.4	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^3P - ^3P^\circ$	1 – 0	K2
	200	1422.176	1422.174	616 644.2	–	686 959.1	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^1P$	2 – 1	K2
	250	1424.995	1424.999	618 473.9	–	688 649.4	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3P$	1 – 1	K2
	600	1431.935	1431.932	618 473.9	–	688 309.6	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3P$	1 – 0	K2
	10	1432.97	1432.958	766 880.8	–	836 666.5	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3D^\circ - ^2[^1/_2]$	1 – 0	A1
	700	1441.825	1441.824	618 473.9	–	687 830.5	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3P$	1 – 2	K2
	800	1447.512	1447.513	616 644.2	–	685 728.2	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^1D$	2 – 2	K2
	600	1457.956	1457.953	620 060.1	–	688 649.4	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3P$	0 – 1	K2
	250	1460.168	1460.170	618 473.9	–	686 959.1	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^1P$	1 – 1	K2
	15	1466.24	1466.218	759 596.8	–	827 799.5	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[^1/_2]$	1 – 0	A1
	30	1470.024	1470.015	760 472.3	–	828 498.8	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3P^\circ - ^2[^1/_2]$	2 – 1	A1
	40	1471.303	1471.304	760 472.3	–	828 439.2	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3P^\circ - ^2[^3/_2]$	2 – 2	A1

Al IV — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
	700	1486.887	1486.894	618 473.9	–	685 728.2	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^1D$	1 – 2	K2
	800	1494.791	1494.791	620 060.1	–	686 959.1	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^1P$	0 – 1	K2
	300	1507.442	1507.441	616 644.2	–	682 981.8	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3D$	2 – 1	K2
	100	1511.88	1511.880	759 596.8	–	825 739.6	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[^3/_2]$	1 – 2	A1
	10	1513.20	1513.214	759 193.4	–	825 277.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[^3/_2]$	0 – 1	A1
	400	1519.07	1519.073	770 836.9	–	836 666.5	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^1P^\circ - ^2[^1/_2]$	1 – 0	A1
	300	1532.16	1532.161	760 472.3	–	825 739.6	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[^3/_2]$	2 – 2	A1
	800	1537.540	1537.537	616 644.2	–	681 683.3	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3D$	2 – 2	K2
	500	1550.192	1550.198	618 473.9	–	682 981.8	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3D$	1 – 1	K2
	1	1556.88	1556.873	763 613.6	–	827 844.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3F^\circ - ^2[^3/_2]$	2 – 1	A1
	1000	1557.254	1557.254	616 644.2	–	680 859.8	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3D$	2 – 3	K2
	500	1559.03	1559.038	764 297.1	–	828 439.2	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^1F^\circ - ^2[^3/_2]$	3 – 2	A1
	700	1564.164	1564.164	624 717.5	–	688 649.4	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^1P^\circ - ^3P$	1 – 1	K2
	100	1572.54	1572.522	624 717.5	–	688 309.6	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^1P^\circ - ^3P$	1 – 0	K2
	900	1582.040	1582.043	618 473.9	–	681 683.3	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3D$	1 – 2	K2
	800	1584.460	1584.460	624 717.5	–	687 830.5	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^1P^\circ - ^3P$	1 – 2	K2
	400	1589.275	1589.277	620 060.1	–	682 981.8	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3D$	0 – 1	K2
	300	1602.77	1602.780	761 688.4	–	824 080.0	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3F^\circ - ^2[^5/_2]$	4 – 3	A1
	400	1606.646	1606.642	624 717.5	–	686 959.1	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^1P^\circ - ^1P$	1 – 1	K2
	1	1607.31	1607.317	759 193.4	–	821 408.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[^1/_2]$	0 – 1	A1
	400	1617.81	1617.806	759 596.8	–	821 408.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[^1/_2]$	1 – 1	A1
	200	1617.93	1617.927	762 272.5	–	824 080.0	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3F^\circ - ^2[^5/_2]$	3 – 3	A1
	350	1621.68	1621.684	763 613.6	–	825 277.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3F^\circ - ^2[^3/_2]$	2 – 1	A1
	600	1627.536	1627.538	764 297.1	–	825 739.6	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^1F^\circ - ^2[^3/_2]$	3 – 2	A1
	50	1628.58	1628.572	767 035.7	–	828 439.2	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^1D^\circ - ^2[^3/_2]$	2 – 2	A1
	500	1636.822	1636.830	767 345.5	–	828 439.2	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3D^\circ - ^2[^3/_2]$	3 – 2	A1
	800	1639.055	1639.057	624 717.5	–	685 728.2	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^1P^\circ - ^1D$	1 – 2	K2
	300	1641.05	1641.050	760 472.3	–	821 408.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3P^\circ - ^2[^1/_2]$	2 – 1	A1
	200	1641.20	1641.198	763 613.6	–	824 544.7	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3F^\circ - ^2[^5/_2]$	2 – 2	A1
	50	1641.55	1641.532	766 880.8	–	827 799.5	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3D^\circ - ^2[^1/_2]$	1 – 0	A1
	200	1644.47	1644.488	767 035.7	–	827 844.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^1D^\circ - ^2[^3/_2]$	2 – 1	A1
	1	1647.79	1647.756	767 750.6	–	828 439.2	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^3D^\circ - ^2[^3/_2]$	2 – 2	A1
	20	1672.722	1672.719	764 297.1	–	824 080.0	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^1F^\circ - ^2[^5/_2]$	3 – 3	A1
	200	1712.43	1712.414	766 880.8	–	825 277.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{3/2})4p$	$^3D^\circ - ^2[^3/_2]$	1 – 1	A1
	5	1716.28	1716.317	624 717.5	–	682 981.8	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^1P^\circ - ^3D$	1 – 1	K2
	20	1754.120	1754.140	770 836.9	–	827 844.9	$2s^22p^5(^2P^\circ)3d - 2s^22p^5(^2P^\circ_{1/2})4p$	$^1P^\circ - ^2[^3/_2]$	1 – 1	A1
	100	1755.431	1755.439	624 717.5	–	681 683.3	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^1P^\circ - ^3D$	1 – 2	K2
	200	1762.424	1762.425	714 096.9	–	770 836.9	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1S - ^1P^\circ$	0 – 1	K2
	1000	1818.563	1818.569	616 644.2	–	671 632.5	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3S$	2 – 1	K2
	700	1881.159	1881.163	618 473.9	–	671 632.5	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3S$	1 – 1	K2
	50	1894.48	1894.517	714 096.9	–	766 880.8	$2s^22p^5(^2P^\circ)3p - 2s^22p^5(^2P^\circ)3d$	$^1S - ^3D^\circ$	0 – 1	K2
	300	1939.022	1939.022	620 060.1	–	671 632.5	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^3P^\circ - ^3S$	0 – 1	K2
		Air Wavelength (Å)								
	30	2016.19	2016.17	821 408.9	–	870 991.9	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[^1/_2] - ^2[^3/_2]^\circ$	1 – 2	A1
	40	2128.45	2128.46	824 544.7	–	871 512.2	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[^5/_2] - ^2[^3/_2]^\circ$	2 – 1	A1
	200	2130.837	2130.842	624 717.5	–	671 632.5	$2s^22p^5(^2P^\circ)3s - 2s^22p^5(^2P^\circ)3p$	$^1P^\circ - ^3S$	1 – 1	K1
	200*bl*	2130.92	{2130.98	827 844.9	–	874 756.8	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^2[^3/_2] - ^2[^1/_2]^\circ$	1 – 1	A1
			2130.98	824 080.0	–	870 991.9	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[^5/_2] - ^2[^3/_2]^\circ$	3 – 2	
	15	2146.25	2146.26	827 844.9	–	874 422.9	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^2[^3/_2] - ^2[^1/_2]^\circ$	1 – 0	A1
	30	2152.29	2152.31	824 544.7	–	870 991.9	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[^5/_2] - ^2[^3/_2]^\circ$	2 – 2	A1
	100	2158.32	2158.33	828 439.2	–	874 756.8	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^2[^3/_2] - ^2[^1/_2]^\circ$	2 – 1	A1

Al IV – Continued

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
	5	2161.12	2161.11	828 498.8	–	874 756.8	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^2[1/2]-{}^2[1/2]^\circ$	1 – 1	Al
	15	2162.24	2162.22	825 277.9	–	871 512.2	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[3/2]-{}^2[3/2]^\circ$	1 – 1	Al
	5	2176.84	2176.82	828 498.8	–	874 422.9	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^2[1/2]-{}^2[1/2]^\circ$	1 – 0	Al
	10	2184.05	2184.03	825 739.6	–	871 512.2	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[3/2]-{}^2[3/2]^\circ$	2 – 1	Al
	15	2209.14	2209.14	825 739.6	–	870 991.9	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[3/2]-{}^2[3/2]^\circ$	2 – 2	Al
	3	2211.21	2211.21	852 007.5	–	897 217.6	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[1/2]^\circ-{}^2[3/2]$	1 – 2	Al
	2	2212.21	2212.21	852 007.5	–	897 197.1	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[1/2]^\circ-{}^2[3/2]$	1 – 1	Al
	30	2229.13	2229.15	852 570.5	–	897 416.8	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[3/2]^\circ-{}^2[5/2]$	2 – 3	Al
	50*bl*	2240.47	{2240.37	852 706.8	–	897 328.4	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[7/2]^\circ-{}^2[9/2]$	4 – 4	Al
			2240.56	852 706.8	–	897 324.7	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[7/2]^\circ-{}^2[9/2]$	4 – 5	
	300	2240.563	2240.558	852 706.8	–	897 324.7	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[7/2]^\circ-{}^2[9/2]$	4 – 5	Al
	100	2257.187	2257.183	853 039.1	–	897 328.4	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[7/2]^\circ-{}^2[9/2]$	3 – 4	Al
	60	2260.838	2260.833	856 625.8	–	900 843.6	$2s^22p^5(^2P^\circ_{1/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[5/2]^\circ-{}^2[7/2]$	2 – 3	Al
	20	2272.348	2272.345	856 843.1	–	900 836.9	$2s^22p^5(^2P^\circ_{1/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[3/2]^\circ-{}^2[5/2]$	2 – 3	Al
	50	2272.66	2272.66	856 859.9	–	900 847.7	$2s^22p^5(^2P^\circ_{1/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[5/2]^\circ-{}^2[7/2]$	3 – 4	Al
	40	2283.027	2283.021	853 749.4	–	897 537.5	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[5/2]^\circ-{}^2[7/2]$	2 – 3	Al
	2	2287.01	2286.96	827 799.5	–	871 512.2	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[1/2]-{}^2[3/2]^\circ$	0 – 1	Al
	2	2288.29	2288.34	853 749.4	–	897 435.7	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[5/2]^\circ-{}^2[5/2]$	2 – 2	Al
	50	2294.524	2294.524	853 971.5	–	897 540.1	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[5/2]^\circ-{}^2[7/2]$	3 – 4	Al
	3	2301.04	2301.04	853 971.5	–	897 416.8	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[5/2]^\circ-{}^2[5/2]$	3 – 3	Al
	20	2324.13	2324.14	828 498.8	–	871 512.2	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[1/2]-{}^2[3/2]^\circ$	1 – 1	Al
	40	2368.272	2368.266	858 642.0	–	900 854.1	$2s^22p^5(^2P^\circ_{1/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[3/2]^\circ-{}^2[5/2]$	1 – 2	Al
	50	2371.027	2371.024	855 272.7	–	897 435.7	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[3/2]^\circ-{}^2[5/2]$	1 – 2	Al
	5	2383.355	2383.353	855 272.7	–	897 217.6	$2s^22p^5(^2P^\circ_{3/2})4d - 2s^22p^5(^2P^\circ_{3/2})5f$	$^2[3/2]^\circ-{}^2[3/2]$	1 – 2	Al
	80	2495.47	2495.46	857 409.6	–	897 470.3	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[3/2]-{}^2[5/2]^\circ$	1 – 2	Al
	200	2497.14	2497.15	857 436.7	–	897 470.3	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[3/2]-{}^2[5/2]^\circ$	2 –	Al
	5	2501.37	2501.39	857 642.7	–	897 608.5	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[9/2]-{}^2[9/2]^\circ$	5 –	Al
	3*bl*	2501.60	2501.59	857 645.9	–	897 608.5	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[9/2]-{}^2[9/2]^\circ$	4 –	Al
	300	2507.76	2507.79	857 642.7	–	897 506.5	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[9/2]-[11/2]^\circ$	5 –	Al
	300	2508.01	2507.99	857 645.9	–	897 506.5	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[9/2]-[11/2]^\circ$	4 – 5	Al
	200	2514.30	2514.30	857 810.5	–	897 571.0	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[5/2]-{}^2[7/2]^\circ$	3 –	Al
	100	2515.48	{2515.50	861 246.9	–	900 988.4	$2s^22p^5(^2P^\circ_{1/2})4f - 2s^22p^5(^2P^\circ_{1/2})5g$	$^2[7/2]-{}^2[7/2]^\circ$	3 –	Al
			2515.50	861 246.9	–	900 988.4	$2s^22p^5(^2P^\circ_{1/2})4f - 2s^22p^5(^2P^\circ_{1/2})5g$	$^2[7/2]-{}^2[9/2]^\circ$	3 – 4	
	400	2515.87	{2515.85	861 252.4	–	900 988.4	$2s^22p^5(^2P^\circ_{1/2})4f - 2s^22p^5(^2P^\circ_{1/2})5g$	$^2[7/2]-{}^2[7/2]^\circ$	4 –	Al
			2515.85	861 252.4	–	900 988.4	$2s^22p^5(^2P^\circ_{1/2})4f - 2s^22p^5(^2P^\circ_{1/2})5g$	$^2[7/2]-{}^2[9/2]^\circ$	4 –	
			2515.86	857 835.1	–	897 571.0	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[5/2]-{}^2[7/2]^\circ$	2 – 3	
	80*bl*	2516.20	2516.19	861 257.7	–	900 988.4	$2s^22p^5(^2P^\circ_{1/2})4f - 2s^22p^5(^2P^\circ_{1/2})5g$	$^2[5/2]-{}^2[7/2]^\circ$	3 –	Al
	200	2517.29	2517.27	861 274.8	–	900 988.4	$2s^22p^5(^2P^\circ_{1/2})4f - 2s^22p^5(^2P^\circ_{1/2})5g$	$^2[5/2]-{}^2[7/2]^\circ$	2 – 3	Al
	10	2520.68	2520.69	857 810.5	–	897 470.3	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[5/2]-{}^2[5/2]^\circ$	3 –	Al
	5	2522.28	2522.25	857 835.1	–	897 470.3	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[5/2]-{}^2[5/2]^\circ$	2 –	Al
	150*bl*	2527.27	2527.23	858 051.4	–	897 608.5	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[7/2]-{}^2[9/2]^\circ$	3 – 4	Al
	200	2527.50	2527.50	858 055.6	–	897 608.5	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[7/2]-{}^2[9/2]^\circ$	4 –	Al
	6	2529.63	2529.63	858 051.4	–	897 571.0	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[7/2]-{}^2[7/2]^\circ$	3 –	Al
	10	2529.90	2529.90	858 055.6	–	897 571.0	$2s^22p^5(^2P^\circ_{3/2})4f - 2s^22p^5(^2P^\circ_{3/2})5g$	$^2[7/2]-{}^2[7/2]^\circ$	4 –	Al
	5	2624.54	2624.56	836 666.5	–	874 756.8	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{1/2})5s$	$^2[1/2]-{}^2[1/2]^\circ$	0 – 1	Al
	5	2868.98	2868.95	836 666.5	–	871 512.2	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{3/2})5s$	$^2[1/2]-{}^2[3/2]^\circ$	0 – 1	Al
	300	2961.29	2961.31	802 907.5	–	836 666.5	$2s^22p^5(^2P^\circ_{3/2})4s - 2s^22p^5(^2P^\circ_{1/2})4p$	$^2[3/2]^\circ-{}^2[1/2]$	1 – 0	Al
	500	3208.20	3208.15	821 408.9	–	852 570.5	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^2[1/2]-{}^2[3/2]^\circ$	1 – 2	Al
	10	3214.13	3214.14	825 739.6	–	856 843.1	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^2[3/2]-{}^2[3/2]^\circ$	2 – 2	Al
	20	3241.343	3241.344	827 799.5	–	858 642.0	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^2[1/2]-{}^2[3/2]^\circ$	0 – 1	Al
	100	3246.143	3246.123	827 844.9	–	858 642.0	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^2[3/2]-{}^2[3/2]^\circ$	1 – 1	Al
	15	3253.426	3253.422	824 544.7	–	855 272.7	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^2[5/2]-{}^2[3/2]^\circ$	2 – 1	Al
	500	3267.213	3267.181	821 408.9	–	852 007.5	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^2[1/2]-{}^2[1/2]^\circ$	1 – 1	Al
	600	3285.13	3285.11	806 234.9	–	836 666.5	$2s^22p^5(^2P^\circ_{1/2})4s - 2s^22p^5(^2P^\circ_{1/2})4p$	$^2[1/2]^\circ-{}^2[1/2]$	1 – 0	Al
	150	3297.943	3297.943	821 408.9	–	851 722.1	$2s^22p^5(^2P^\circ_{3/2})4p - 2s^22p^5(^2P^\circ_{3/2})4d$	$^2[1/2]-{}^2[1/2]^\circ$	1 – 0	Al
	200	3316.546	3316.543	828 498.8	–	858 642.0	$2s^22p^5(^2P^\circ_{1/2})4p - 2s^22p^5(^2P^\circ_{1/2})4d$	$^2[1/2]-{}^2[3/2]^\circ$	1 – 1	Al

Mult. No.	Rel. Int.	Air Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
	300	3332.962	3332.953	825 277.9	–	855 272.7	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[3/2] - ^2[3/2]^o$	1 – 1	A1
	400	3344.46	3344.47	824 080.0	–	853 971.5	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[5/2] - ^2[5/2]^o$	3 – 3	A1
	350	3423.125	3423.125	824 544.7	–	853 749.4	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[5/2] - ^2[5/2]^o$	2 – 2	A1
	50	3452.159	3452.157	824 080.0	–	853 039.1	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[5/2] - ^2[7/2]^o$	3 – 3	A1
	500	3473.536	3473.532	827 844.9	–	856 625.8	$2s^22p^5(^2P^o_{1/2})4p - 2s^22p^5(^2P^o_{1/2})4d$	$^2[3/2] - ^2[5/2]^o$	1 – 2	A1
	900	3492.226	3492.231	824 080.0	–	852 706.8	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[5/2] - ^2[7/2]^o$	3 – 4	A1
	800	3508.457	3508.458	824 544.7	–	853 039.1	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[5/2] - ^2[7/2]^o$	2 – 3	A1
	500	3511.284	3511.280	825 277.9	–	853 749.4	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[3/2] - ^2[5/2]^o$	1 – 2	A1
	700	3517.556	3517.556	828 439.2	–	856 859.9	$2s^22p^5(^2P^o_{1/2})4p - 2s^22p^5(^2P^o_{1/2})4d$	$^2[3/2] - ^2[5/2]^o$	2 – 3	A1
	5	3519.638	3519.637	828 439.2	–	856 843.1	$2s^22p^5(^2P^o_{1/2})4p - 2s^22p^5(^2P^o_{1/2})4d$	$^2[3/2] - ^2[3/2]^o$	2 – 2	A1
	400	3527.034	3527.038	828 498.8	–	856 843.1	$2s^22p^5(^2P^o_{1/2})4p - 2s^22p^5(^2P^o_{1/2})4d$	$^2[1/2] - ^2[3/2]^o$	1 – 2	A1
	500	3541.076	3541.081	825 739.6	–	853 971.5	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[3/2] - ^2[5/2]^o$	2 – 3	A1
	10	3546.770	3546.772	828 439.2	–	856 625.8	$2s^22p^5(^2P^o_{1/2})4p - 2s^22p^5(^2P^o_{1/2})4d$	$^2[3/2] - ^2[5/2]^o$	2 – 2	A1
	50	3638.86	3638.87	827 799.5	–	855 272.7	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[1/2] - ^2[3/2]^o$	0 – 1	A1
	1	3662.01	3662.03	825 739.6	–	853 039.1	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[3/2] - ^2[7/2]^o$	2 – 3	A1
	2	3662.88	3662.95	825 277.9	–	852 570.5	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[3/2] - ^2[3/2]^o$	1 – 2	A1
	300	3725.92	3725.99	825 739.6	–	852 570.5	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[3/2] - ^2[3/2]^o$	2 – 2	A1
	10	3805.81	3805.85	825 739.6	–	852 007.5	$2s^22p^5(^2P^o_{3/2})4p - 2s^22p^5(^2P^o_{3/2})4d$	$^2[3/2] - ^2[1/2]^o$	2 – 1	A1
	10	4190.41	4190.41	801 882.3	–	825 739.6	$2s^22p^5(^2P^o_{3/2})4s - 2s^22p^5(^2P^o_{3/2})4p$	$^2[3/2]^o - ^2[3/2]$	2 – 2	A1
	10	4378.58	4378.57	802 907.5	–	825 739.6	$2s^22p^5(^2P^o_{3/2})4s - 2s^22p^5(^2P^o_{3/2})4p$	$^2[3/2]^o - ^2[3/2]$	1 – 2	A1
	5	4411.38	4411.36	801 882.3	–	824 544.7	$2s^22p^5(^2P^o_{3/2})4s - 2s^22p^5(^2P^o_{3/2})4p$	$^2[3/2]^o - ^2[5/2]$	2 – 2	A1
	7	4436.15	4436.26	805 309.7	–	827 844.9	$2s^22p^5(^2P^o_{1/2})4s - 2s^22p^5(^2P^o_{1/2})4p$	$^2[1/2]^o - ^2[3/2]$	0 – 1	A1
	20	4468.85	4468.94	802 907.5	–	825 277.9	$2s^22p^5(^2P^o_{3/2})4s - 2s^22p^5(^2P^o_{3/2})4p$	$^2[3/2]^o - ^2[3/2]$	1 – 1	A1
	30	4502.25	4502.37	806 234.9	–	828 439.2	$2s^22p^5(^2P^o_{1/2})4s - 2s^22p^5(^2P^o_{1/2})4p$	$^2[1/2]^o - ^2[3/2]$	1 – 2	A1
	40	4503.74	4503.71	801 882.3	–	824 080.0	$2s^22p^5(^2P^o_{3/2})4s - 2s^22p^5(^2P^o_{3/2})4p$	$^2[3/2]^o - ^2[5/2]$	2 – 3	A1
	5	4549.27	4549.25	836 666.5	–	858 642.0	$2s^22p^5(^2P^o_{1/2})4p - 2s^22p^5(^2P^o_{1/2})4d$	$^2[1/2] - ^2[3/2]^o$	0 – 1	A1
	15	4620.35	4620.38	802 907.5	–	824 544.7	$2s^22p^5(^2P^o_{3/2})4s - 2s^22p^5(^2P^o_{3/2})4p$	$^2[3/2]^o - ^2[5/2]$	1 – 2	A1
	5	4626.06	4626.19	806 234.9	–	827 844.9	$2s^22p^5(^2P^o_{1/2})4s - 2s^22p^5(^2P^o_{1/2})4p$	$^2[1/2]^o - ^2[3/2]$	1 – 1	A1

Al v

F I isoelectronic sequence

Ground state $1s^22s^22p^5\ ^2P^\circ_{3/2}$

Ionization energy 1 240 684 ± 20 cm^{-1} (153.825 ± 0.003 eV)

The resonance-doublet wavelengths at 278 and 281 Å and the lines measured by Artru and Brillet in the 99 – 190 Å range have estimated uncertainties of 0.002 Å [A2]. The four-place calculated wavelengths (95 – 190 Å) also have uncertainties of about 0.002 Å and "are internally consistent to 0.0005 Å" [A2]. Most of the three-place observed wavelengths above 456 Å have estimated uncertainties smaller than 0.010 Å, and the two-place values have uncertainties mainly between 0.01 and 0.02 Å [A2, B3].

A line observed in the infrared spectrum of Nova Cygni 1975 was classified as the $2s^22p^5\ ^2P^\circ_{3/2} - ^2P^\circ_{1/2}$ magnetic-dipole transition in Al v [G2]. The observed wavenumber is 0.9% greater than the predicted value of 3442 ± 3 cm^{-1} but this discrepancy is apparently within the error of th(astronomical measurement.

References

A2 Artru, M. -C., and Brillet, W. L. [1974], J. Opt. Soc. Am. 64 1063 – 1071.

B3 Brillet, W. L., and Artru, M. -C. [1975], J. Opt. Soc. Am. 65 1399 – 1403.

F2 Ferner, E. [1948], Ark. Mat. Astron. Fys. 36, 1 – 65.

F8 Ferner, E. [1947], unpublished material.

G2 Grasdalen, G. L., and Joyce, R. R. [1976], Nature 259, 187 – 189

Al v

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	50g	85.662	85.662	0	1 167 380	$2s^22p^5 - 2s^22p^4(^1D)5d$	$^2P^\circ - ^2S$	3/2 – 1/2	F2
	350g	85.804	85.804	0	1 165 450	$2s^22p^5 - 2s^22p^4(^3P)6d$	$^2P^\circ - ^2D$	3/2 – 5/2	F2
	10g,bl	85.922	{85.915	3 442	1 167 380	$2s^22p^5 - 2s^22p^4(^1D)5d$	$^2P^\circ - ^2S$	1/2 – 1/2	F2
			85.922	0	1 163 850	$2s^22p^5 - 2s^22p^4(^3P)6d$	$^2P^\circ - ^2D$	3/2 – 3/2	
	100g	87.020	87.020	0	1 149 160	$2s^22p^5 - 2s^22p^4(^1S)4d$	$^2P^\circ - ^2D$	3/2 – 5/2	F2
	50g	87.279	87.274	3 442	1 149 260	$2s^22p^5 - 2s^22p^4(^1S)4d$	$^2P^\circ - ^2D$	1/2 – 3/2	F2
	100g	88.425	88.425	0	1 130 900	$2s^22p^5 - 2s^22p^4(^3P)5d$	$^2P^\circ - ^2D$	3/2 – 5/2	F2
	400g,bl	88.539	88.547	0	1 129 350	$2s^22p^5 - 2s^22p^4(^3P)5d$	$^2P^\circ - ^2D$	3/2 – 3/2	F2
	100g	88.636	88.636	3 442	1 131 650	$2s^22p^5 - 2s^22p^4(^3P)5d$	$^2P^\circ - ^2P$	1/2 – 3/2	F2
	200g,bl	88.688	88.688	0	1 127 550	$2s^22p^5 - 2s^22p^4(^3P)5d$	$^2P^\circ - ^4D$	3/2 – 5/2	F2
	50g	88.817	88.817	3 442	1 129 350	$2s^22p^5 - 2s^22p^4(^3P)5d$	$^2P^\circ - ^2D$	1/2 – 3/2	F2
	1g	88.945	88.945	3 442	1 127 730	$2s^22p^5 - 2s^22p^4(^3P)5d$	$^2P^\circ - ^4D$	1/2 – 3/2	F2
	250g,bl	90.630	90.631	0	1 103 380	$2s^22p^5 - 2s^22p^4(^1D)4d$	$^2P^\circ - ^2P$	3/2 – 3/2	F2
	100g	90.646	90.646	0	1 103 190	$2s^22p^5 - 2s^22p^4(^1D)4d$	$^2P^\circ - ^2D$	3/2 – 5/2	F2
	200g	90.701	90.700	0	1 102 540	$2s^22p^5 - 2s^22p^4(^1D)4d$	$^2P^\circ - ^2S$	3/2 – 1/2	F2
	200g	90.914	90.914	3 442	1 103 380	$2s^22p^5 - 2s^22p^4(^1D)4d$	$^2P^\circ - ^2P$	1/2 – 3/2	F2
	50g	90.982	90.984	3 442	1 102 540	$2s^22p^5 - 2s^22p^4(^1D)4d$	$^2P^\circ - ^2S$	1/2 – 1/2	F2
	10g	91.078	91.078	3 442	1 101 400	$2s^22p^5 - 2s^22p^4(^1D)4d$	$^2P^\circ - ^2P$	1/2 – 1/2	F2
	50g	91.750	91.747	0	1 089 957	$2s^22p^5 - 2s^22p^4(^1S)4s$	$^2P^\circ - ^2S$	3/2 – 1/2	F2
	10g	92.039	92.037	3 442	1 089 957	$2s^22p^5 - 2s^22p^4(^1S)4s$	$^2P^\circ - ^2S$	1/2 – 1/2	F2
	20g	93.654	93.653	0	1 067 770	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^2P$	3/2 – 3/2	F2
	350g	93.755	93.755	0	1 066 610	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^2D$	3/2 – 5/2	F2
	200g	93.855	93.856	0	1 065 460	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^2D$	3/2 – 3/2	F2
	70g	93.880	93.882	0	1 065 170	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^2P$	3/2 – 1/2	F2
	300g	93.955	93.956	3 442	1 067 770	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^2P$	1/2 – 3/2	F2
	100g	93.981	93.981	0	1 064 050	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^4P$	3/2 – 5/2	F2
	70g	94.089	94.089	0	1 062 820	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^4D$	3/2 – 3/2	F2
	120g	94.117	94.117	0	1 062 510	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^4D$	3/2 – 5/2	F2
	100g	94.160	94.160	3 442	1 065 460	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^2D$	1/2 – 3/2	F2
	100g	94.187	94.186	3 442	1 065 170	$2s^22p^5 - 2s^22p^4(^3P)4d$	$^2P^\circ - ^2P$	1/2 – 1/2	F2

Al v – Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	10g	94.321	94.321	3 442	1 063 650	$2s^22p^5-2s^22p^4(^3P)4d$	$^2P^o-^4P$	1/2–3/2	F2
	10g	94.394	94.395	3 442	1 062 820	$2s^22p^5-2s^22p^4(^3P)4d$	$^2P^o-^4D$	1/2–3/2	F2
	30g	95.835	95.8323	0	1 043 490	$2s^22p^5-2s^22p^4(^1D)4s$	$^2P^o-^2D$	3/2–5/2	F2
	20g	96.150	96.1489	3 442	1 043 495	$2s^22p^5-2s^22p^4(^1D)4s$	$^2P^o-^2D$	1/2–3/2	F2
	20g	99.200	99.1992	0	1 008 073	$2s^22p^5-2s^22p^4(^3P)4s$	$^2P^o-^2P$	3/2–1/2	F2
	10g	99.277	99.276	0	1 007 290	$2s^22p^5-2s^22p^4(^1S)3d$	$^2P^o-^2D$	3/2–3/2	A2
	100g	99.290	99.290	0	1 007 146	$2s^22p^5-2s^22p^4(^1S)3d$	$^2P^o-^2D$	3/2–5/2	A2
	40g	99.425	99.4243	0	1 005 790	$2s^22p^5-2s^22p^4(^3P)4s$	$^2P^o-^2P$	3/2–3/2	A2
	30g	99.541	99.5390	3 442	1 008 073	$2s^22p^5-2s^22p^4(^3P)4s$	$^2P^o-^2P$	1/2–1/2	A2
	80g	99.614	99.617	3 442	1 007 290	$2s^22p^5-2s^22p^4(^1S)3d$	$^2P^o-^2D$	1/2–3/2	A2
	10g	99.774	99.7657	3 442	1 005 790	$2s^22p^5-2s^22p^4(^3P)4s$	$^2P^o-^2P$	1/2–3/2	A2
	300g	103.805	{103.8035	0	963 359	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2F$	3/2–5/2	A2
			{103.8078	0	963 319	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2D$	3/2–3/2	
	400g	103.882	103.8820	0	962 631	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2D$	3/2–5/2	A2
	150g	103.992	103.9892	0	961 638	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2P$	3/2–1/2	A2
	250g	104.072	104.0727	0	960 868	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2P$	3/2–3/2	A2
	200g	104.122	104.1217	0	960 415	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2S$	3/2–1/2	A2
	250g	104.181	104.1800	3 442	963 319	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2D$	1/2–3/2	A2
	200g	104.362	104.3628	3 442	961 638	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2P$	1/2–1/2	A2
	100g	104.447	104.4468	3 442	960 868	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2P$	1/2–3/2	A2
	150g	104.496	104.4962	3 442	960 415	$2s^22p^5-2s^22p^4(^1D)3d$	$^2P^o-^2S$	1/2–1/2	A2
	200g	107.711	107.7113	0	928 408	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^2P$	3/2–3/2	A2
	600g	107.948	107.9461	0	926 388	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^2D$	3/2–5/2	A2
	150g	108.005	108.0037	0	925 894	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^2P$	3/2–1/2	A2
	300g	108.059	108.0576	0	925 432	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^2D$	3/2–3/2	A2
	300g	108.113	108.1121	3 442	928 408	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^2P$	1/2–3/2	A2
	100g	108.316	108.3157	0	923 227.2	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4P$	3/2–5/2	A2
	150g	108.388	108.3882	0	922 610	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^2F$	3/2–5/2	A2
	150g	108.406	108.4067	3 442	925 894	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^2P$	1/2–1/2	A2
	50g	108.445	108.4443	0	922 132.8	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4P$	3/2–3/2	A2
	200g	108.462	108.4610	3 442	925 432	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^2D$	1/2–3/2	A2
	20g	108.530	108.5287	0	921 415.4	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4P$	3/2–1/2	A2
	50g	108.617	108.6160	0	920 675	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4F$	3/2–3/2	A2
	200g	108.708	108.7073	0	919 901	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4F$	3/2–5/2	A2
	30g	108.849	108.8506	3 442	922 132.8	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4P$	1/2–3/2	A2
	10g,d	108.941	108.9356	3 442	921 415.4	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4P$	1/2–1/2	A2
	100g	109.024	109.0236	3 442	920 675	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4F$	1/2–3/2	A2
	2g	109.630	109.6296	0	912 162.7	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4D$	3/2–1/2	A2
	5g	109.675	109.6756	0	911 780.0	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4D$	3/2–3/2	A2
	1g	109.730	109.7298	0	911 329.2	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4D$	3/2–5/2	A2
	5g	110.045	110.0448	3 442	912 162.7	$2s^22p^5-2s^22p^4(^3P)3d$	$^2P^o-^4D$	1/2–1/2	A2
	250g	118.497	118.495	0	843 914	$2s^22p^5-2s^22p^4(^1S)3s$	$^2P^o-^2S$	3/2–1/2	A2
	200g	118.983	118.981	3 442	843 914	$2s^22p^5-2s^22p^4(^1S)3s$	$^2P^o-^2S$	1/2–1/2	A2
	900g	125.529	125.5300	0	796 622.4	$2s^22p^5-2s^22p^4(^1D)3s$	$^2P^o-^2D$	3/2–5/2	A2
	800g	126.068	126.0699	3 442	796 652.9	$2s^22p^5-2s^22p^4(^1D)3s$	$^2P^o-^2D$	1/2–3/2	A2
	800g	130.411	130.4134	0	766 792.2	$2s^22p^5-2s^22p^4(^3P)3s$	$^2P^o-^2P$	3/2–1/2	A2
	1000g	130.847	130.8472	0	764 250.4	$2s^22p^5-2s^22p^4(^3P)3s$	$^2P^o-^2P$	3/2–3/2	A2
	900g	131.002	131.0015	3 442	766 792.2	$2s^22p^5-2s^22p^4(^3P)3s$	$^2P^o-^2P$	1/2–1/2	A2
	900g	131.438	131.4391	3 442	764 250.4	$2s^22p^5-2s^22p^4(^3P)3s$	$^2P^o-^2P$	1/2–3/2	A2
	1g	132.407	132.4087	0	755 237.4	$2s^22p^5-2s^22p^4(^3P)3s$	$^2P^o-^4P$	3/2–1/2	A2
	500g	132.626	132.6278	0	753 989.5	$2s^22p^5-2s^22p^4(^3P)3s$	$^2P^o-^4P$	3/2–3/2	A2
	200g	133.010	{133.0070	0	751 840.1	$2s^22p^5-2s^22p^4(^3P)3s$	$^2P^o-^4P$	3/2–5/2	A2
			{133.0149	3 442	755 237.4	$2s^22p^5-2s^22p^4(^3P)3s$	$^2P^o-^4P$	1/2–1/2	
	50g	133.233	133.2361	3 442	753 989.5	$2s^22p^5-2s^22p^4(^3P)3s$	$^2P^o-^4P$	1/2–3/2	A2
	50	135.219	135.220?	358 816	1 098 350?	$2s2p^6-2s2p^5(^3P^o)3s$	$^2S-^2P^o$	1/2–1/2	F8

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm⁻¹) Lower		Upper	Configurations	Terms	J Values	Re
	100	135.617	135.618?	358 816	–	1 096 180?	$2s2p^6 - 2s2p^5(^3P^o)3s$	$^2S - {}^2P^o$	$1/2 - 3/2$	F
	5	179.003	179.004	358 816	–	917 463	$2s2p^6 - 2s^22p^4(^1S)3p$	$^2S - {}^2P^o$	$1/2 - 3/2$	A
	2	189.977	189.9775	358 816	–	885 194	$2s2p^6 - 2s^22p^4(^1D)3p$	$^2S - {}^2P^o$	$1/2 - 1/2$	A
	10	190.569	190.5695	358 816	–	883 559	$2s2p^6 - 2s^22p^4(^1D)3p$	$^2S - {}^2P^o$	$1/2 - 3/2$	A
	1000*g*	278.604	278.604	0	–	358 816	$2s^22p^5 - 2s2p^6$	$^2P^o - {}^2S$	$3/2 - 1/2$	A
	900*g*	281.394	281.394	3 442	–	358 816	$2s^22p^5 - 2s2p^6$	$^2P^o - {}^2S$	$1/2 - 1/2$	A
	15	456.08	456.079	910 974.6	–	1 130 235	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)5f$	$^4D - {}^2[4]^o$	$7/2 - 9/2$	B
	8	456.73	456.730	911 329.2	–	1 130 277	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)5f$	$^4D - {}^2[4]^o$	$5/2 - 7/2$	B
	10	457.00	457.001	911 780.0	–	1 130 598	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)5f$	$^4D - {}^2[2]^o$	$3/2 - 3/2$	B
	10	463.51	{463.506	955 751	–	1 171 498	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)5f$	$^2G - {}^2[5]^o$	$7/2 - 9/2$	B
			{463.514	955 755	–	1 171 498	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)5f$	$^2G - {}^2[5]^o$	$9/2 - 11/2$	
	8	466.24	466.242	918 757	–	1 133 238	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)5f$	$^4F - {}^2[4]^o$	$7/2 - 9/2$	B
	20	469.24	469.239	917 612	–	1 130 723	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)5f$	$^4F - {}^2[5]^o$	$9/2 - 11/2$	B
	5	471.34	471.336	921 075	–	1 133 238	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)5f$	$^2F - {}^2[4]^o$	$7/2 - 9/2$	B
	5	471.74	471.740	918 757	–	1 130 738	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)5f$	$^4F - {}^2[5]^o$	$7/2 - 9/2$	B
	8	474.75	474.750	922 610	–	1 133 247	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)5f$	$^2F - {}^2[4]^o$	$5/2 - 7/2$	B
	8	475.63	475.632	923 227.2	–	1 133 474	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)5f$	$^4P - {}^2[3]^o$	$5/2 - 7/2$	B
	10*bl*	479.02	{479.014	963 354	–	1 172 116	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)5f$	$^2F - {}^2[4]^o$	$7/2 - 9/2$	B
			{479.026	963 359	–	1 172 116	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)5f$	$^2F - {}^2[4]^o$	$5/2 - 7/2$	
	5	536.73	536.732	818 136.3	–	1 004 449	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4P^o - {}^4P$	$3/2 - 1/2$	A
	3	538.90	538.903	817 364.9	–	1 002 927	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4P^o - {}^4P$	$5/2 - 3/2$	A
	3	541.161	541.153	818 136.3	–	1 002 927	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4P^o - {}^4P$	$3/2 - 3/2$	A
	20	543.572	543.581	818 961.6	–	1 002 927	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4P^o - {}^4P$	$1/2 - 3/2$	A
	50	544.29	544.300	817 364.9	–	1 001 087	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4P^o - {}^4P$	$5/2 - 5/2$	A
	40	546.60	546.595	818 136.3	–	1 001 087	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4P^o - {}^4P$	$3/2 - 5/2$	A
	30	561.40	561.400	865 368.9	–	1 043 495	$2s^22p^4(^1D)3p - 2s^22p^4(^1D)4s$	$^2F^o - {}^2D$	$5/2 - 3/2$	A
	m		562.730	865 784.9	–	1 043 490	$2s^22p^4(^1D)3p - 2s^22p^4(^1D)4s$	$^2F^o - {}^2D$	$7/2 - 5/2$	A
	20	566.847	566.849	828 035.1	–	1 004 449	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4D^o - {}^4P$	$3/2 - 1/2$	A
	60	568.492	568.498	827 025.0	–	1 002 927	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4D^o - {}^4P$	$5/2 - 3/2$	A
	20	568.629	568.625	828 586.1	–	1 004 449	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4D^o - {}^4P$	$1/2 - 1/2$	A
	100	570.364	570.353	825 757	–	1 001 087	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4D^o - {}^4P$	$7/2 - 5/2$	A
	15	571.76	571.782	828 035.1	–	1 002 927	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4D^o - {}^4P$	$3/2 - 3/2$	A2
	5	574.499	574.508	827 025.0	–	1 001 087	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4D^o - {}^4P$	$5/2 - 5/2$	A2
	8	574.77	574.751	834 084.7	–	1 008 073	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^2D^o - {}^2P$	$3/2 - 1/2$	A2
	50	575.473	575.465	832 017.6	–	1 005 790	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^2D^o - {}^2P$	$5/2 - 3/2$	A2
	2	579.53	579.529	917 403	–	1 089 957	$2s^22p^4(^1S)3p - 2s^22p^4(^1S)4s$	$^2P^o - {}^2S$	$1/2 - 1/2$	A2
	5	579.73	579.730	917 463	–	1 089 957	$2s^22p^4(^1S)3p - 2s^22p^4(^1S)4s$	$^2P^o - {}^2S$	$3/2 - 1/2$	A2
	10	582.395	582.393	834 084.7	–	1 005 790	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^2D^o - {}^2P$	$3/2 - 3/2$	A2
	10	584.334	584.332	836 937.4	–	1 008 073	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^2P^o - {}^2P$	$3/2 - 1/2$	A2
	20	585.61	585.629	835 033.3	–	1 005 790	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^2P^o - {}^2P$	$1/2 - 3/2$	A2
	4	588.371	588.390	838 117.8	–	1 008 073	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^2S^o - {}^2P$	$1/2 - 1/2$	A2
	8	590.078	590.078	874 026.0	–	1 043 495	$2s^22p^4(^1D)3p - 2s^22p^4(^1D)4s$	$^2D^o - {}^2D$	$3/2 - 3/2$	A2
	10	590.98	590.982	874 280.1	–	1 043 490	$2s^22p^4(^1D)3p - 2s^22p^4(^1D)4s$	$^2D^o - {}^2D$	$5/2 - 5/2$	A2
	4	592.24	592.233	836 937.4	–	1 005 790	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^2P^o - {}^2P$	$3/2 - 3/2$	A2
	8	605.03	605.031	837 646.2	–	1 002 927	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)4s$	$^4S^o - {}^4P$	$3/2 - 3/2$	A2
	15	620.460	620.460	911 329.2	–	1 072 500	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_0)4f$	$^4D - {}^2[3]^o$	$5/2 - 7/2$	B3
	10	622.02	622.017	910 974.6	–	1 071 742	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4D - {}^2[3]^o$	$7/2 - 7/2$	B3
	10	623.39	623.392	911 329.2	–	1 071 742	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4D - {}^2[3]^o$	$5/2 - 7/2$	B3
	20	623.749	623.743	910 974.6	–	1 071 297	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4D - {}^2[4]^o$	$7/2 - 9/2$	B3
	25	627.400	627.396	911 780.0	–	1 071 169	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4D - {}^2[2]^o$	$3/2 - 5/2$	B3
	25	629.062	629.060	912 162.7	–	1 071 130	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4D - {}^2[2]^o$	$1/2 - 3/2$	B3
	8	635.64	635.628	911 329.2	–	1 068 654	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4D - {}^2[2]^o$	$5/2 - 5/2$	B3
	10	636.008	636.001	910 974.6	–	1 068 207	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4D - {}^2[3]^o$	$7/2 - 7/2$	B3
	30	636.552	636.548	910 974.6	–	1 068 072	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4D - {}^2[4]^o$	$7/2 - 7/2$	B3
	90	636.708	636.710	910 974.6	–	1 068 032	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4D - {}^2[4]^o$	$7/2 - 9/2$	B3
	30	637.675	637.675	911 329.2	–	1 068 149	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4D - {}^2[3]^o$	$5/2 - 5/2$	B3

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	80	637.984	637.988	911 329.2	1 068 072	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4D - ^2[4]^o$	5/2 – 7/2	B3
	30	638.147	638.146	911 780.0	1 068 484	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4D - ^2[2]^o$	3/2 – 3/2	B3
	50	639.518	639.513	911 780.0	1 068 149	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4D - ^2[3]^o$	3/2 – 5/2	B3
	30	639.712	639.708	912 162.7	1 068 484	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4D - ^2[2]^o$	1/2 – 3/2	B3
	25	646.009	645.995	955 751	1 110 551	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2G - ^2[4]^o$		B3
	100	651.204	651.194	955 751	1 109 315	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2G - ^2[5]^o$		B3
	5	653.66	653.659	918 757	1 071 742	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4F - ^2[3]^o$	7/2 – 7/2	B3
	10	655.300	655.312	919 901	1 072 500	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_0)4f$	$^4F - ^2[3]^o$	5/2 – 7/2	B3
	65	655.564	655.566	918 757	1 071 297	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4F - ^2[4]^o$	7/2 – 9/2	B3
	1	658.42	658.428	919 901	1 071 778	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4F - ^2[3]^o$	5/2 – 5/2	B3
	60*bl*	658.56	658.558	920 675	1 072 522	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_0)4f$	$^4F - ^2[3]^o$	3/2 – 5/2	B3
	70*bl*	660.36	660.371	919 901	1 071 331	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4F - ^2[4]^o$	5/2 – 7/2	B3
	100	660.964	660.965	917 612	1 068 906	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4F - ^2[5]^o$	9/2 – 11/	B3
	50	661.803	661.800	920 675	1 071 778	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4F - ^2[3]^o$	3/2 – 5/2	B3
	5	663.72	663.715	921 075	1 071 742	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2F - ^2[3]^o$	7/2 – 7/2	B3
	50	664.804	664.805	917 612	1 068 032	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4F - ^2[4]^o$	9/2 – 9/2	B3
	90	665.675	665.681	921 075	1 071 297	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2F - ^2[4]^o$	7/2 – 9/2	B3
	90	665.938	665.939	918 757	1 068 921	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4F - ^2[5]^o$	7/2 – 9/2	B3
	70	667.156	667.156	922 610	1 072 500	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_0)4f$	$^2F - ^2[3]^o$	5/2 – 7/2	B3
	50	667.944	667.938	921 415.4	1 071 130	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4P - ^2[2]^o$	1/2 – 3/2	B3
	1	668.26	668.247	922 132.8	1 071 778	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4P - ^2[3]^o$	3/2 – 5/2	B3
	25	669.720	669.725	918 757	1 068 072	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4F - ^2[4]^o$	7/2 – 7/2	B3
	10	669.92	669.914	923 227.2	1 072 500	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_0)4f$	$^4P - ^2[3]^o$	5/2 – 7/2	B3
	20	670.546	670.547	922 610	1 071 742	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2F - ^2[3]^o$	5/2 – 7/2	B3
	50	670.977	670.978	922 132.8	1 071 169	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4P - ^2[2]^o$	3/2 – 5/2	B3
	40	673.104	673.106	960 868	1 109 433	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2P - ^2[2]^o$	3/2 – 5/2	B3
	70	673.325	673.334	923 227.2	1 071 742	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4P - ^2[3]^o$	5/2 – 7/2	B3
	20	674.269	674.282	919 901	1 068 207	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4F - ^2[3]^o$	5/2 – 7/2	B3
	15	674.53	674.545	919 901	1 068 149	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4F - ^2[3]^o$	5/2 – 5/2	B3
	10	674.88	674.896	919 901	1 068 072	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4F - ^2[4]^o$	5/2 – 7/2	B3
	15	675.20	675.202	923 227.2	1 071 331	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4P - ^2[4]^o$	5/2 – 7/2	B3
	30	675.336	675.324	960 415	1 108 492	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2S - ^2[1]^o$	1/2 –	B3
	20	675.938	675.941	923 227.2	1 071 169	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^4P - ^2[2]^o$	5/2 – 5/2	B3
	65	676.380	676.379	921 075	1 068 921	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2F - ^2[5]^o$	7/2 – 9/2	B3
	45	676.595	{ 676.595	961 638	1 109 437	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2P - ^2[2]^o$	1/2 – 3/2	B3
			{ 676.606	921 415.4	1 069 212	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4P - ^2[1]^o$	1/2 – 3/2	
	40	676.838	676.839	921 415.4	1 069 161	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4P - ^2[1]^o$	1/2 – 1/2	B3
	55	677.248	677.245	962 631	1 110 288	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2D - ^2[3]^o$	5/2 – 7/2	B3
	20	677.377	677.397	960 868	1 108 492	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2P - ^2[1]^o$	3/2 –	B3
	100	679.373	{ 679.362	963 354	1 110 551	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2F - ^2[4]^o$	7/2 – 9/2	B3
			{ 679.385	963 359	1 110 551	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2F - ^2[4]^o$	5/2 – 7/2	
	10	679.659	679.662	921 075	1 068 207	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2F - ^2[3]^o$	7/2 – 7/2	B3
	30	679.909	679.906	922 132.8	1 069 212	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4P - ^2[1]^o$	3/2 – 3/2	B3
	1	680.15	680.142	922 132.8	1 069 161	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4P - ^2[1]^o$	3/2 – 1/2	B3
	40*bl*	680.41	680.416	963 319	1 110 288	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2D - ^2[3]^o$	3/2 – 5/2	B3
	10*bl*	680.44	680.471	921 075	1 068 032	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2F - ^2[4]^o$	7/2 – 9/2	B3
	50	680.586	{ 680.578	963 354	1 110 288	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2F - ^2[3]^o$	7/2 – 7/2	B3
			{ 680.601	963 359	1 110 288	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2F - ^2[3]^o$	5/2 – 5/2	
	5	680.955	680.948	961 638	1 108 492	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2P - ^2[1]^o$	1/2 –	B3
	40*bl*	681.22	681.190	962 631	1 109 433	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2D - ^2[2]^o$	5/2 – 5/2	B3
	15	682.496	682.495	922 132.8	1 068 654	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4P - ^2[2]^o$	3/2 – 5/2	B3
	25*bl*	683.31	683.312	925 432	1 071 778	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2D - ^2[3]^o$	3/2 – 5/2	B3
	60	684.402	{ 684.397	963 319	1 109 433	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2D - ^2[2]^o$	3/2 – 5/2	B3
			{ 684.406	926 388	1 072 500	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_0)4f$	$^2D - ^2[3]^o$	5/2 – 7/2	
	1	684.58	{ 684.561	963 354	1 109 433	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2F - ^2[2]^o$	7/2 – 5/2	B3
			{ 684.566	963 359	1 109 437	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2F - ^2[2]^o$	5/2 – 3/2	

Al v – Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	5	684.74	684.725	922 610	1 068 654	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2F - ^2[2]^\circ$	$5/2 - 5/2$	B3
	5*bl*	685.58	685.584	962 631	1 108 492	$2s^22p^4(^1D)3d - 2s^22p^4(^1D_2)4f$	$^2D - ^2[1]^\circ$	$5/2 - 3/2$	B3
	10	686.169	686.168	925 432	1 071 169	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2D - ^2[2]^\circ$	$3/2 - 5/2$	B3
	60	686.827	686.827	922 610	1 068 207	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2F - ^2[3]^\circ$	$5/2 - 7/2$	B3
	1	687.81	687.805	926 388	1 071 778	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2D - ^2[3]^\circ$	$5/2 - 5/2$	B3
	25	688.531	688.535	925 894	1 071 130	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2P - ^2[2]^\circ$	$1/2 - 3/2$	B3
	1	689.76	689.751	923 227.2	1 068 207	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^4P - ^2[3]^\circ$	$5/2 - 7/2$	B3
	60	689.927	689.926	926 388	1 071 331	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2D - ^2[4]^\circ$	$5/2 - 7/2$	B3
	60	693.896	693.895	928 408	1 072 522	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_0)4f$	$^2P - ^2[3]^\circ$	$3/2 - 5/2$	B3
	60	697.491	697.496	928 408	1 071 778	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2P - ^2[3]^\circ$	$3/2 - 5/2$	B3
	40	697.751	697.749	925 894	1 069 212	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2P - ^2[1]^\circ$	$1/2 - 3/2$	B3
	50	698.218	698.217	925 432	1 068 654	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2D - ^2[2]^\circ$	$3/2 - 5/2$	B3
	30	700.473	700.471	928 408	1 071 169	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_1)4f$	$^2P - ^2[2]^\circ$	$3/2 - 5/2$	B3
	40	700.680	700.687	925 432	1 068 149	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2D - ^2[3]^\circ$	$3/2 - 5/2$	B3
	5	701.315	701.311	925 894	1 068 484	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2P - ^2[2]^\circ$	$1/2 - 3/2$	B3
	70	705.127	705.124	926 388	1 068 207	$2s^22p^4(^3P)3d - 2s^22p^4(^3P_2)4f$	$^2D - ^2[3]^\circ$	$5/2 - 7/2$	B3
	30	826.826	826.832	764 250.4	885 194	$2s^22p^4(^3P)3s - 2s^22p^4(^1D)3p$	$^2P - ^2P^\circ$	$3/2 - 1/2$	A2
	80	838.156	838.163	764 250.4	883 559	$2s^22p^4(^3P)3s - 2s^22p^4(^1D)3p$	$^2P - ^2P^\circ$	$3/2 - 3/2$	A2
	m		844.582	766 792.2	885 194	$2s^22p^4(^3P)3s - 2s^22p^4(^1D)3p$	$^2P - ^2P^\circ$	$1/2 - 1/2$	A2
	50	856.394	856.408	766 792.2	883 559	$2s^22p^4(^3P)3s - 2s^22p^4(^1D)3p$	$^2P - ^2P^\circ$	$1/2 - 3/2$	A2
	60	944.62	944.623	817 364.9	923 227.2	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4P$	$5/2 - 5/2$	A2
	40	951.55	951.557	818 136.3	923 227.2	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4P$	$3/2 - 5/2$	A2
	40	954.49	954.491	817 364.9	922 132.8	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4P$	$5/2 - 3/2$	A2
	2	961.54	961.571	818 136.3	922 132.8	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4P$	$3/2 - 3/2$	A2
	40	968.25	968.250	818 136.3	921 415.4	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4P$	$3/2 - 1/2$	A2
	30	969.26	969.263	818 961.6	922 132.8	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4P$	$1/2 - 3/2$	A2
	2	976.05	976.050	818 961.6	921 415.4	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4P$	$1/2 - 1/2$	A2
	20	1020.52	1020.51	865 368.9	963 359	$2s^22p^4(^1D)3p - 2s^22p^4(^1D)3d$	$^2F^\circ - ^2F$	$5/2 - 5/2$	A2
	50	1024.91	1024.92	865 784.9	963 354	$2s^22p^4(^1D)3p - 2s^22p^4(^1D)3d$	$^2F^\circ - ^2F$	$7/2 - 7/2$	A2
	5	1028.17	1028.15	865 368.9	962 631	$2s^22p^4(^1D)3p - 2s^22p^4(^1D)3d$	$^2F^\circ - ^2D$	$5/2 - 5/2$	A2
	1	1057.36	1057.36	828 035.1	922 610	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4D^\circ - ^2F$	$3/2 - 5/2$	A2
	2	1059.14	1059.153	817 364.9	911 780.0	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4D$	$5/2 - 3/2$	A2
	5	1059.65	1059.65	832 017.6	926 388	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^2D^\circ - ^2D$	$5/2 - 5/2$	A2
	3	1063.27	1063.26	827 025.0	921 075	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4D^\circ - ^2F$	$5/2 - 7/2$	A2
	10	1063.53	1063.531	818 136.3	912 162.7	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4D$	$3/2 - 1/2$	A2
	70	1064.24	1064.234	817 364.9	911 329.2	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4D$	$5/2 - 5/2$	A2
	80	1067.87	1067.877	818 136.3	911 780.0	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4D$	$3/2 - 3/2$	A2
	250	1068.26	1068.265	817 364.9	910 974.6	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4D$	$5/2 - 7/2$	A2
	200	1073.02	1073.043	818 136.3	911 329.2	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4D$	$3/2 - 5/2$	A2
	10	1075.28	1075.27	825 757	918 757	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4D^\circ - ^4F$	$7/2 - 7/2$	A2
	30	1076.73	1076.70	827 025.0	919 901	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4D^\circ - ^4F$	$5/2 - 5/2$	A2
	40	1077.35	1077.37	818 961.6	911 780.0	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4P^\circ - ^4D$	$1/2 - 3/2$	A2
	30	1079.41	1079.45	828 035.1	920 675	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4D^\circ - ^4F$	$3/2 - 3/2$	A2
	70	1085.92	1085.91	828 586.1	920 675	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4D^\circ - ^4F$	$1/2 - 3/2$	A2
	100	1088.52	1088.54	828 035.1	919 901	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4D^\circ - ^4F$	$3/2 - 5/2$	A2
	500	1088.67	1088.67	825 757	917 612	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4D^\circ - ^4F$	$7/2 - 9/2$	A2
	300	1090.14	1090.13	827 025.0	918 757	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^4D^\circ - ^4F$	$5/2 - 7/2$	A2
	8	1093.22	1093.25	836 937.4	928 408	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^2P^\circ - ^2P$	$3/2 - 3/2$	A2
	10	1094.75	1094.72	834 084.7	925 432	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^2D^\circ - ^2D$	$3/2 - 3/2$	A2
	10	1100.60	1100.59	835 033.3	925 894	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^2P^\circ - ^2P$	$1/2 - 1/2$	A2
		1103.85	1103.84	832 017.6	922 610	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^2D^\circ - ^2F$	$5/2 - 5/2$	A2
	20	1106.20	1106.21	835 033.3	925 432	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^2P^\circ - ^2D$	$1/2 - 3/2$	A2
	70	1106.41	1106.41	865 368.9	955 751	$2s^22p^4(^1D)3p - 2s^22p^4(^1D)3d$	$^2F^\circ - ^2G$	$5/2 - 7/2$	A2
	20	1107.55	1107.54	838 117.8	928 408	$2s^22p^4(^3P)3p - 2s^22p^4(^3P)3d$	$^2S^\circ - ^2P$	$1/2 - 3/2$	A2
	100	1111.48	1111.48	865 784.9	955 755	$2s^22p^4(^1D)3p - 2s^22p^4(^1D)3d$	$^2F^\circ - ^2G$	$7/2 - 9/2$	A2

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	20	1112.51	1112.51	917 403 –	1 007 290	$2s^22p^4(^1S)3p-2s^22p^4(^1S)3d$	$^2P^\circ-{}^2D$	$1/2-3/2$	A2
	10	1115.04	1115.04	917 463 –	1 007 146	$2s^22p^4(^1S)3p-2s^22p^4(^1S)3d$	$^2P^\circ-{}^2D$	$3/2-5/2$	A2
	50	1117.93	1117.94	836 937.4 –	926 388	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^2P^\circ-{}^2D$	$3/2-5/2$	A2
	30	1119.39	1119.41	874 026.0 –	963 359	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2D^\circ-{}^2F$	$3/2-5/2$	A2
	10	1119.94	1119.91	874 026.0 –	963 319	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2D^\circ-{}^2D$	$3/2-3/2$	A2
	20	1121.79	1121.80	834 084.7 –	923 227.2	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^2D^\circ-{}^4P$	$3/2-5/2$	A2
	50	1122.66	1122.66	874 280.1 –	963 354	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2D^\circ-{}^2F$	$5/2-7/2$	A2
	200	1122.88	1122.87	832 017.6 –	921 075	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^2D^\circ-{}^2F$	$5/2-7/2$	A2
	2	1128.62	1128.60	874 026.0 –	962 631	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2D^\circ-{}^2D$	$3/2-5/2$	A2
	80	1129.43	1129.42	796 652.9 –	885 194	$2s^22p^4(^1D)3s-2s^22p^4(^1D)3p$	$^2D-{}^2P^\circ$	$3/2-1/2$	A2
	60	1129.62	1129.62	834 084.7 –	922 610	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^2D^\circ-{}^2F$	$3/2-5/2$	A2
	2	1130.00	1130.01	836 937.4 –	925 432	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^2P^\circ-{}^2D$	$3/2-3/2$	A2
	10	1131.84	1131.85	874 280.1 –	962 631	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2D^\circ-{}^2D$	$5/2-5/2$	A2
	1	1139.25	1139.26	838 117.8 –	925 894	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^2S^\circ-{}^2P$	$1/2-1/2$	A2
	1	1141.39	1141.40	874 026.0 –	961 638	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2D^\circ-{}^2P$	$3/2-1/2$	A2
	300	1150.30	1150.26	796 622.4 –	883 559	$2s^22p^4(^1D)3s-2s^22p^4(^1D)3p$	$^2D-{}^2P^\circ$	$5/2-3/2$	A2
	10	1150.67	1150.67	796 652.9 –	883 559	$2s^22p^4(^1D)3s-2s^22p^4(^1D)3p$	$^2D-{}^2P^\circ$	$3/2-3/2$	A2
	30	1152.89	1152.88	832 017.6 –	918 757	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^2D^\circ-{}^4F$	$5/2-7/2$	A2
	10	1154.90	1154.90	874 280.1 –	960 868	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2D^\circ-{}^2P$	$5/2-3/2$	A2
	350	1165.42	1165.42	751 840.1 –	837 646.2	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4S^\circ$	$5/2-3/2$	A2
	250	1168.48	1168.48	837 646.2 –	923 227.2	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4S^\circ-{}^4P$	$3/2-5/2$	A2
	200	1173.47	1173.47	825 757 –	910 974.6	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4D^\circ-{}^4D$	$7/2-7/2$	A2
	20	1179.86	1179.87	827 025.0 –	911 780.0	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4D^\circ-{}^4D$	$5/2-3/2$	A2
	120	1183.62	1183.62	837 646.2 –	922 132.8	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4S^\circ-{}^4P$	$3/2-3/2$	A2
	100	1186.18	1186.18	827 025.0 –	911 329.2	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4D^\circ-{}^4D$	$5/2-5/2$	A2
	15	1188.67	1188.67	828 035.1 –	912 162.7	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4D^\circ-{}^4D$	$3/2-1/2$	A2
	8	1191.20	1191.19	827 025.0 –	910 974.6	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4D^\circ-{}^4D$	$5/2-7/2$	A2
	50	1193.76	1193.76	837 646.2 –	921 415.4	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4S^\circ-{}^4P$	$3/2-1/2$	A2
	10	1194.10	1194.10	828 035.1 –	911 780.0	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4D^\circ-{}^4D$	$3/2-3/2$	A2
	200	1195.37	1195.36	753 989.5 –	837 646.2	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4S^\circ$	$3/2-3/2$	A2
	20	1200.56	1200.56	828 035.1 –	911 329.2	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4D^\circ-{}^4D$	$3/2-5/2$	A2
	10	1202.00	1202.01	828 586.1 –	911 780.0	$2s^22p^4(^3P)3p-2s^22p^4(^3P)3d$	$^4D^\circ-{}^4D$	$1/2-3/2$	A2
	50	1213.48	1213.46	755 237.4 –	837 646.2	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4S^\circ$	$1/2-3/2$	A2
	3	1253.11	1253.13	883 559 –	963 359	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2P^\circ-{}^2F$	$3/2-5/2$	A2
	2	1253.76	1253.76	883 559 –	963 319	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2P^\circ-{}^2D$	$3/2-3/2$	A2
	10	1264.67	1264.67	883 559 –	962 631	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2P^\circ-{}^2D$	$3/2-5/2$	A2
	8	1280.01	1280.00	885 194 –	963 319	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2P^\circ-{}^2D$	$1/2-3/2$	A2
	500	1287.70	1287.70	796 622.4 –	874 280.1	$2s^22p^4(^1D)3s-2s^22p^4(^1D)3p$	$^2D-{}^2D^\circ$	$5/2-5/2$	A2
	100	1288.23	1288.21	796 652.9 –	874 280.1	$2s^22p^4(^1D)3s-2s^22p^4(^1D)3p$	$^2D-{}^2D^\circ$	$3/2-5/2$	A2
	30	1291.91	1291.93	796 622.4 –	874 026.0	$2s^22p^4(^1D)3s-2s^22p^4(^1D)3p$	$^2D-{}^2D^\circ$	$5/2-3/2$	A2
	200	1292.44	1292.44	796 652.9 –	874 026.0	$2s^22p^4(^1D)3s-2s^22p^4(^1D)3p$	$^2D-{}^2D^\circ$	$3/2-3/2$	A2
	30	1293.51	1293.51	883 559 –	960 868	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2P^\circ-{}^2P$	$3/2-3/2$	A2
	10	1301.13	1301.14	883 559 –	960 415	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2P^\circ-{}^2S$	$3/2-1/2$	A2
	5	1308.16	1308.15	885 194 –	961 638	$2s^22p^4(^1D)3p-2s^22p^4(^1D)3d$	$^2P^\circ-{}^2P$	$1/2-1/2$	A2
	10	1312.43	1312.42	751 840.1 –	828 035.1	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4D^\circ$	$5/2-5/2$	A2
	400	1330.06	1330.05	751 840.1 –	827 025.0	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4D^\circ$	$5/2-5/2$	A2
	10	1340.52	1340.54	753 989.5 –	828 586.1	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4D^\circ$	$3/2-1/2$	A2
	400	1350.518	1350.519	753 989.5 –	828 035.1	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4D^\circ$	$3/2-3/2$	A2
	m		1352.87	751 840.1 –	825 757	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4D^\circ$	$5/2-7/2$	A2
	bl	1353.745	1353.777	764 250.4 –	838 117.8	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^2P-{}^2S^\circ$	$3/2-1/2$	A2
	150	1359.64	1359.64	843 914 –	917 463	$2s^22p^4(^1S)3s-2s^22p^4(^1S)3p$	$^2S-{}^2P^\circ$	$1/2-3/2$	A2
	400	1363.351	1363.351	755 237.4 –	828 586.1	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4D^\circ$	$1/2-1/2$	A2
	600	1369.20	1369.20	753 989.5 –	827 025.0	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4D^\circ$	$3/2-5/2$	A2
	300	1373.70	1373.67	755 237.4 –	828 035.1	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^4P-{}^4D^\circ$	$1/2-3/2$	A2
	100	1375.79	1375.76	764 250.4 –	836 937.4	$2s^22p^4(^3P)3s-2s^22p^4(^3P)3p$	$^2P-{}^2P^\circ$	$3/2-3/2$	A2

Al V — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	100	1402.021	1402.021	766 792.2 –	838 117.8	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^2P - ^2S^o$	1/2 – 1/2	A2
	100	1412.772	1412.771	764 250.4 –	835 033.3	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^2P - ^2P^o$	3/2 – 1/2	A2
	80	1425.64	1425.61	766 792.2 –	836 937.4	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^2P - ^2P^o$	1/2 – 3/2	A2
	m		1431.96	764 250.4 –	834 084.7	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^2P - ^2D^o$	3/2 – 3/2	A2
	400	1445.87	1445.87	796 622.4 –	865 784.9	$2s^22p^4(^1D)3s - 2s^22p^4(^1D)3p$	$^2D - ^2F^o$	5/2 – 7/2	A2
	30	1454.65	1454.62	796 622.4 –	865 368.9	$2s^22p^4(^1D)3s - 2s^22p^4(^1D)3p$	$^2D - ^2F^o$	5/2 – 5/2	A2
	300	1455.265	1455.265	796 652.9 –	865 368.9	$2s^22p^4(^1D)3s - 2s^22p^4(^1D)3p$	$^2D - ^2F^o$	3/2 – 5/2	A2
	10	1465.392	1465.393	766 792.2 –	835 033.3	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^2P - ^2P^o$	1/2 – 1/2	A2
	600	1475.64	1475.64	764 250.4 –	832 017.6	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^2P - ^2D^o$	3/2 – 5/2	A2
	300	1486.05	1486.05	766 792.2 –	834 084.7	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^2P - ^2D^o$	1/2 – 3/2	A2
	700	1508.37	1508.38	751 840.1 –	818 136.3	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^4P - ^4P^o$	5/2 – 3/2	A2
	1000	1526.14	1526.14	751 840.1 –	817 364.9	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^4P - ^4P^o$	5/2 – 5/2	A2
	500	1539.124	1539.122	753 989.5 –	818 961.6	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^4P - ^4P^o$	3/2 – 1/2	A2
	150	1558.92	1558.92	753 989.5 –	818 136.3	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^4P - ^4P^o$	3/2 – 3/2	A2
	50	1569.25	1569.26	755 237.4 –	818 961.6	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^4P - ^4P^o$	1/2 – 1/2	A2
	300	1577.90	1577.90	753 989.5 –	817 364.9	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^4P - ^4P^o$	3/2 – 5/2	A2
	10	1579.38	1579.38	1 108 492 –	1 171 808	$2s^22p^4(^1D_2)4f - 2s^22p^4(^1D_2)5g$	$^2[1]^o - ^2[2]$		B3
	350	1589.87	1589.85	755 237.4 –	818 136.3	$2s^22p^4(^3P)3s - 2s^22p^4(^3P)3p$	$^4P - ^4P^o$	1/2 – 3/2	A2
	40	1592.62	1592.56	1 068 032 –	1 130 824	$2s^22p^4(^3P_2)4f - 2s^22p^4(^3P_2)5g$	$^2[4]^o - ^2[5]$	9/2 – 11/2	B3
	20	1593.54	1593.58	1 068 072 –	1 130 824	$2s^22p^4(^3P_2)4f - 2s^22p^4(^3P_2)5g$	$^2[4]^o - ^2[5]$	7/2 – 9/2	B3
	20	1595.46	1595.46	1 068 149 –	1 130 827	$2s^22p^4(^3P_2)4f - 2s^22p^4(^3P_2)5g$	$^2[3]^o - ^2[4]$	5/2 – 7/2	B3
	60	1596.95	{1596.93	1 068 207 –	1 130 827	$2s^22p^4(^3P_2)4f - 2s^22p^4(^3P_2)5g$	$^2[3]^o - ^2[4]$	7/2 –	B3
			{1596.96	1 109 315 –	1 171 934	$2s^22p^4(^1D_2)4f - 2s^22p^4(^1D_2)5g$	$^2[5]^o - ^2[6]$		
	20*d*	1602.03	{1602.02	1 071 130 –	1 133 551	$2s^22p^4(^3P_1)4f - 2s^22p^4(^3P_1)5g$	$^2[2]^o - ^2[3]$	3/2 – 5/2	B3
			{1602.02	1 068 484 –	1 130 905	$2s^22p^4(^3P_2)4f - 2s^22p^4(^3P_2)5g$	$^2[2]^o - ^2[3]$	3/2 – 5/2	
	10	1621.36	1621.35	1 110 551 –	1 172 228	$2s^22p^4(^1D_2)4f - 2s^22p^4(^1D_2)5g$	$^2[4]^o - ^2[5]$		B3
		Air Wavelength (Å)							
	20	2479.75	2479.72	796 622.4 –	836 937.4	$2s^22p^4(^1D)3s - 2s^22p^4(^3P)3p$	$^2D - ^2P^o$	5/2 – 3/2	A2
	5	2481.60	2481.60	796 652.9 –	836 937.4	$2s^22p^4(^1D)3s - 2s^22p^4(^3P)3p$	$^2D - ^2P^o$	3/2 – 3/2	A2
	10	2604.71	2604.72	796 652.9 –	835 033.3	$2s^22p^4(^1D)3s - 2s^22p^4(^3P)3p$	$^2D - ^2P^o$	3/2 – 1/2	A2
		Wavenumber (cm^{-1})							
	M1	3473	3442	0 –	3 442	$2s^22p^5 - 2s^22p^5$	$^2P^o - ^2P^o$	3/2 – 1/2	G2

O I isoelectronic sequence

Ground state $1s^22s^22p^4\ ^3P_2$

Ionization energy 1 536 400±400 cm^{-1} (190.49±0.05 eV)

The measurements of the wavelengths for the $2s^22p^4-2s2p^5$ resonance array (221–328 Å) are probably accurate within a few thousandths of an Å, and the wavelengths from [A3] for the region below 114 Å have estimated uncertainties of 0.005 Å [B3, A3]. Most of the wavelengths given for the region above 1049 Å are probably accurate to about 0.01 Å [A3].

The values for some of the levels above 1 079 000 cm^{-1} as given in [A3] differ somewhat from the preliminary values given in MZ79; we here adopt the values from [A3].

We derived the ionization energy using two types of formulae to fit the isoelectronic-sequence data (see the energy-levels compilation for P VIII by Martin, W. C., Zalubas, R., and Musgrove, A. [1985], J. Phys. Chem. Ref. Data **14**, 786).

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Al VI

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	100g	72.926	72.928	0	– 1 371 210	$2s^22p^4-2s^22p^3(^2P^\circ)4d$?	$^3P-$	2–	F2
	100g	73.076	73.074	2 732	– 1 371 210	$2s^22p^4-2s^22p^3(^2P^\circ)4d$?	$^3P-$	1–	F2
	10g	74.259	74.275?	0	– 1 346 350?	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^3P-{}^1F^\circ$	2–3	F2
	50g	74.346	74.349	0	– 1 345 000	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^3P-$	2–	F2
	300g	74.444	74.442	0	– 1 343 320	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^3P-{}^3P^\circ$	2–2	F2
	50g	74.504	74.501	2 732	– 1 345 000	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^3P-$	1–	F2
	150g	74.592	74.594	2 732	– 1 343 320	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^3P-{}^3P^\circ$	1–2	F2
	250g	74.656	74.658	0	– 1 339 440	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^3P-{}^3D^\circ$	2–3	F2
	50g	74.813	74.811	2 732	– 1 339 440	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^3P-{}^3D^\circ$	1–2	F2
	100g	74.892	74.872	3 829	– 1 339 440	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^3P-{}^3D^\circ$	0–1	F2
	100	75.164	75.186	41 167	– 1 371 210	$2s^22p^4-2s^22p^3(^2P^\circ)4d$?	$^1D-$	2–	F2
	610g	76.402	76.402?	0	– 1 308 870?	$2s^22p^4-2s^22p^3(^2P^\circ)4s$	$^3P-{}^3P^\circ$	2–2	V1
	200	76.618	76.618?	41 167	– 1 346 350?	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^1D-{}^1F^\circ$	2–3	F2
	200	76.697	76.697	41 167	– 1 345 000	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^1D-$	2–	F2
	200	76.794	76.796	41 167	– 1 343 320	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^1D-{}^3P^\circ$	2–2	F2
	50	76.953	76.953?	41 167	– 1 340 660?	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^1D-{}^1P^\circ$	2–1	F2
	50	77.052	77.025	41 167	– 1 339 440	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^1D-{}^3D^\circ$	2–	F2
	500g	77.945	77.945	0	– 1 282 960	$2s^22p^4-2s^22p^3(^4S^\circ)4d$	$^3P-{}^3D^\circ$	2–3	F2
	100g	78.112	78.111	2 732	– 1 282 960	$2s^22p^4-2s^22p^3(^4S^\circ)4d$	$^3P-{}^3D^\circ$	1–2	F2
	50g	78.178	78.178	3 829	– 1 282 960	$2s^22p^4-2s^22p^3(^4S^\circ)4d$	$^3P-{}^3D^\circ$	0–1	F2
	70g	78.459	78.459	0	– 1 274 550	$2s^22p^4-2s^22p^3(^2D^\circ)4s$	$^3P-{}^3D^\circ$	2–3	F2
	10g	78.628	78.628	2 732	– 1 274 550	$2s^22p^4-2s^22p^3(^2D^\circ)4s$	$^3P-{}^3D^\circ$	1–2	F2
	10	78.712	78.712	41 167	– 1 311 620	$2s^22p^4-2s^22p^3(^2P^\circ)4s$	$^1D-{}^1P^\circ$	2–1	F2
	10	79.557	79.568	88 213	– 1 345 000	$2s^22p^4-2s^22p^3(^2D^\circ)4d$	$^1S-$	0–1	F2
	70	80.770	80.770?	41 167	– 1 279 250?	$2s^22p^4-2s^22p^3(^2D^\circ)4s$	$^1D-{}^1D^\circ$	2–2	F2
	50	81.738	81.739	88 213	– 1 311 620	$2s^22p^4-2s^22p^3(^2P^\circ)4s$	$^1S-{}^1P^\circ$	0–1	F2
	70g	82.082	82.082	0	– 1 218 300	$2s^22p^4-2s^22p^3(^4S^\circ)4s$	$^3P-{}^3S^\circ$	2–1	F2
	50g	82.267	82.266	2 732	– 1 218 300	$2s^22p^4-2s^22p^3(^4S^\circ)4s$	$^3P-{}^3S^\circ$	1–1	F2
	10g	82.338	82.340	3 829	– 1 218 300	$2s^22p^4-2s^22p^3(^4S^\circ)4s$	$^3P-{}^3S^\circ$	0–1	F2
	10g	85.189	85.174	0	– 1 174 070	$2s^22p^4-2s^22p^3(^2P^\circ)3d$	$^3P-{}^1F^\circ$	2–3	F2

Al VI – Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	100g	85.422	85.423	0	1 170 650	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^1D^o$	2 – 2	A3
	1000g	85.518	85.518	0	1 169 350	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3D^o$	2 – 3	A3
	200g	85.567	85.566	0	1 168 690	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3D^o$	2 – 2	A3
	300g	85.623	85.622	2 732	1 170 650	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^1D^o$	1 – 2	A3
	300g	85.725	85.725	2 732	1 169 250	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3D^o$	1 – 1	A3
	400g	85.767	85.766	2 732	1 168 690	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3D^o$	1 – 2	A3
	350g	85.806	85.806	3 829	1 169 250	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3D^o$	0 – 1	A3
	350g	85.817	85.817	0	1 165 270	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3P^o$	2 – 2	A3
	100g	85.867	85.866	0	1 164 610	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3P^o$	2 – 1	A3
	150g	86.018	86.019	2 732	1 165 270	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3P^o$	1 – 2	A3
	150g	86.068	86.068	2 732	1 164 610	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3P^o$	1 – 1	A3
	150g	86.094	86.094	2 732	1 164 250	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3P^o$	1 – 0	A3
	200g	86.148	86.149	3 829	1 164 610	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^3P - {}^3P^o$	0 – 1	A3
	400g	87.331	87.332	0	1 145 060	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3S^o$	2 – 1	A3
	350g	87.540	87.541	2 732	1 145 060	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3S^o$	1 – 1	A3
	500g	87.587	87.587	0	1 141 720	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3P^o$	2 – 1	A3
	100g	87.625	87.625	3 829	1 145 060	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3S^o$	0 – 1	A3
	650g	87.651	87.652	0	1 140 880	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3P^o$	2 – 2	A3
	250g	87.776	87.776	2 732	1 142 000	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3P^o$	1 – 0	A3
	250g	87.796	87.797	2 732	1 141 720	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3P^o$	1 – 1	A3
	350g	87.863	87.862	2 732	1 140 880	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3P^o$	1 – 2	A3
	250g	87.883	87.882	3 829	1 141 720	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3P^o$	0 – 1	A3
	1000g	88.163	88.163	0	1 134 260	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3D^o$	2 – 3	A3
	750	88.269	88.269	41 167	1 174 070	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^1D - {}^1F^o$	2 – 3	A3
	100g	88.325	88.320	3 829	1 136 070	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^1P^o$	0 – 1	F2
	750g	88.369	88.369	2 732	1 134 350	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3D^o$	1 – 2	A3
	250g	88.462	88.462	3 829	1 134 260	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^3P - {}^3D^o$	0 – 1	A3
	bl	88.539	88.536	41 167	1 170 650	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^1D - {}^1D^o$	2 – 2	A3
	100	88.687	88.690	41 167	1 168 690	$2s^22p^4 - 2s^22p^3(^2P^o)3d$	$^1D - {}^3D^o$	2 – 2	A3
	1000	90.196	90.196	41 167	1 149 860	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^1D - {}^1F^o$	2 – 3	A3
	600	90.856	90.856	41 167	1 141 810	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^1D - {}^1D^o$	2 – 2	A3
	500	91.332	91.332	41 167	1 136 070	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^1D - {}^1P^o$	2 – 1	A3
	750g	92.626	92.626	0	1 079 610	$2s^22p^4 - 2s^22p^3(^4S^o)3d$	$^3P - {}^3D^o$	2 – 3	A3
	200g	92.638	92.639	0	1 079 456	$2s^22p^4 - 2s^22p^3(^4S^o)3d$	$^3P - {}^3D^o$	2 – 2	A3
	500g	92.875	92.874	2 732	1 079 456	$2s^22p^4 - 2s^22p^3(^4S^o)3d$	$^3P - {}^3D^o$	1 – 2	A3
	250g	92.970	92.971	3 829	1 079 437	$2s^22p^4 - 2s^22p^3(^4S^o)3d$	$^3P - {}^3D^o$	0 – 1	A3
	100	95.433	95.433	88 213	1 136 070	$2s^22p^4 - 2s^22p^3(^2D^o)3d$	$^1S - {}^1P^o$	0 – 1	A3
	10	96.440	96.440	323 002	1 359 920	$2s2p^5 - 2s2p^4(^2S)3s$	$^3P^o - {}^3S$	2 – 1	A3
	50	96.673	96.670	325 469	1 359 920	$2s2p^5 - 2s2p^4(^2S)3s$	$^3P^o - {}^3S$	1 – 1	G3
	600g	100.616	100.616	0	993 874	$2s^22p^4 - 2s^22p^3(^2P^o)3s$	$^3P - {}^3P^o$	2 – 2	A3
	100g	100.638	100.638	0	993 659	$2s^22p^4 - 2s^22p^3(^2P^o)3s$	$^3P - {}^3P^o$	2 – 1	A3
	200g	100.893	100.894	2 732	993 874	$2s^22p^4 - 2s^22p^3(^2P^o)3s$	$^3P - {}^3P^o$	1 – 2	A3
	200g	100.922	100.916	2 732	993 659	$2s^22p^4 - 2s^22p^3(^2P^o)3s$	$^3P - {}^3P^o$	1 –	A3
	150g	101.027	101.027	3 829	993 659	$2s^22p^4 - 2s^22p^3(^2P^o)3s$	$^3P - {}^3P^o$	0 – 1	A3
	10	103.062	103.062	323 002	1 293 290	$2s2p^5 - 2s2p^4(^2D)3s$	$^3P^o - {}^3D$	2 – 3	A3
	300	103.938	103.940	41 167	1 003 265	$2s^22p^4 - 2s^22p^3(^2P^o)3s$	$^1D - {}^1P^o$	2 – 1	A3
	1000g	104.046	104.047	0	961 100	$2s^22p^4 - 2s^22p^3(^2D^o)3s$	$^3P - {}^3D^o$	2 – 3	A3
	800g	104.344	104.344	2 732	961 100	$2s^22p^4 - 2s^22p^3(^2D^o)3s$	$^3P - {}^3D^o$	1 – 2	A3
	400g	104.464	104.464	3 829	961 100	$2s^22p^4 - 2s^22p^3(^2D^o)3s$	$^3P - {}^3D^o$	0 – 1	A3
	700	107.622	107.623	41 167	970 340	$2s^22p^4 - 2s^22p^3(^2D^o)3s$	$^1D - {}^1D^o$	2 – 2	A3
	350	109.284	109.283	88 213	1 003 265	$2s^22p^4 - 2s^22p^3(^2P^o)3s$	$^1S - {}^1P^o$	0 – 1	A3
	1000g	109.516	109.516	0	913 112	$2s^22p^4 - 2s^22p^3(^4S^o)3s$	$^3P - {}^3S^o$	2 – 1	A3
	600g	109.844	109.844	2 732	913 112	$2s^22p^4 - 2s^22p^3(^4S^o)3s$	$^3P - {}^3S^o$	1 – 1	A3
	200g	109.976	109.977	3 829	913 112	$2s^22p^4 - 2s^22p^3(^4S^o)3s$	$^3P - {}^3S^o$	0 – 1	A3
	50	113.140	113.138	323 002	1 206 880	$2s2p^5 - 2s2p^4(^4P)3s$	$^3P^o - {}^3P$	2 – 1	A3

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm⁻¹) Lower	Upper	Configurations	Terms	J Values	Ref.
	50	113.318	113.318	325 469	– 1 207 940	$2s2p^5 - 2s2p^4(^4P)3s$	$^3P^o - ^3P$	1 – 0	A3
	150	113.441	113.441	323 002	– 1 204 520	$2s2p^5 - 2s2p^4(^4P)3s$	$^3P^o - ^3P$	2 – 2	A3
	60*bl*	113.453	113.454	325 469	– 1 206 880	$2s2p^5 - 2s2p^4(^4P)3s$	$^3P^o - ^3P$	1 – 1	A3
	50	113.629	113.628	326 815	– 1 206 880	$2s2p^5 - 2s2p^4(^4P)3s$	$^3P^o - ^3P$	0 – 1	A3
	50	113.759	113.759	325 469	– 1 204 520	$2s2p^5 - 2s2p^4(^4P)3s$	$^3P^o - ^3P$	1 – 2	A3
	50*g*	221.535	221.535	0	– 451 396	$2s^22p^4 - 2s2p^5$	$^3P - ^1P^o$	2 – 1	B3
	600	243.766	243.766	41 167	– 451 396	$2s^22p^4 - 2s2p^5$	$^1D - ^1P^o$	2 – 1	B3
	300	275.343	275.343	88 213	– 451 396	$2s^22p^4 - 2s2p^5$	$^1S - ^1P^o$	0 – 1	B3
	350*g*	307.249	307.249	0	– 325 469	$2s^22p^4 - 2s2p^5$	$^3P - ^3P^o$	2 – 1	B3
	300*g*	308.563	308.563	2 732	– 326 815	$2s^22p^4 - 2s2p^5$	$^3P - ^3P^o$	1 – 0	B3
	400*g*	309.597	309.596	0	– 323 002	$2s^22p^4 - 2s2p^5$	$^3P - ^3P^o$	2 – 2	B3
	300*g*	309.851	309.850	2 732	– 325 469	$2s^22p^4 - 2s2p^5$	$^3P - ^3P^o$	1 – 1	B3
	300*g*	310.907	310.907	3 829	– 325 469	$2s^22p^4 - 2s2p^5$	$^3P - ^3P^o$	0 – 1	B3
	300*g*	312.237	312.237	2 732	– 323 002	$2s^22p^4 - 2s2p^5$	$^3P - ^3P^o$	1 – 2	B3
	100	328.696	328.697	451 396	– 755 628	$2s2p^5 - 2p^6$	$^1P^o - ^1S$	1 – 0	A3
	5	421.46	421.49	88 213	– 325 469	$2s^22p^4 - 2s2p^5$	$^1S - ^3P^o$	0 – 1	B3
	50	1049.67	1049.67	969 421+*x*	– 1 064 689+*x*	$2s^22p^3(^4S^o)3p - 2s^22p^3(^4S^o)3d$	$^5P - ^5D^o$	1 – 1	A3
	40	1049.79	1049.78	969 421+*x*	– 1 064 679+*x*	$2s^22p^3(^4S^o)3p - 2s^22p^3(^4S^o)3d$	$^5P - ^5D^o$	1 – 2	A3
	80	1051.98	1051.98	969 620+*x*	– 1 064 679+*x*	$2s^22p^3(^4S^o)3p - 2s^22p^3(^4S^o)3d$	$^5P - ^5D^o$	2 – 2	A3
	150	1052.12	1052.11	969 620+*x*	– 1 064 667+*x*	$2s^22p^3(^4S^o)3p - 2s^22p^3(^4S^o)3d$	$^5P - ^5D^o$	2 – 3	A3
	200	1056.00	1056.00	969 967+*x*	– 1 064 664+*x*	$2s^22p^3(^4S^o)3p - 2s^22p^3(^4S^o)3d$	$^5P - ^5D^o$	3 – 4	A3
	m		1076.38	986 706	– 1 079 610	$2s^22p^3(^4S^o)3p - 2s^22p^3(^4S^o)3d$	$^3P - ^3D^o$	2 – 3	A3
	2	1077.66	1077.66	986 643	– 1 079 437	$2s^22p^3(^4S^o)3p - 2s^22p^3(^4S^o)3d$	$^3P - ^3D^o$	1 – 1	A3
	40*bl*	1078.17	1078.17	986 706	– 1 079 456	$2s^22p^3(^4S^o)3p - 2s^22p^3(^4S^o)3d$	$^3P - ^3D^o$	2 – 2	A3
	10	1087.65	1087.65	1 039 680	– 1 131 621	$2s^22p^3(^2D^o)3p - 2s^22p^3(^2D^o)3d$	$^1F - ^1G^o$	3 – 4	A3
	400	1320.57	1320.57	961 100	– 1 036 825	$2s^22p^3(^2D^o)3s - 2s^22p^3(^2D^o)3p$	$^3D^o - ^3F$	3 – 4	A3
	900	1321.59	1321.58	894 300+*x*	– 969 967+*x*	$2s^22p^3(^4S^o)3s - 2s^22p^3(^4S^o)3p$	$^5S^o - ^5P$	2 – 3	A3
	300	1324.92	1324.92	961 100	– 1 036 576	$2s^22p^3(^2D^o)3s - 2s^22p^3(^2D^o)3p$	$^3D^o - ^3F$	2 – 3	A3
	800	1327.68	1327.67	894 300+*x*	– 969 620+*x*	$2s^22p^3(^4S^o)3s - 2s^22p^3(^4S^o)3p$	$^5S^o - ^5P$	2 – 2	A3
	200	1329.15	1329.15	961 100	– 1 036 336	$2s^22p^3(^2D^o)3s - 2s^22p^3(^2D^o)3p$	$^3D^o - ^3F$	1 – 2	A3
	500	1331.19	1331.19	894 300+*x*	– 969 421+*x*	$2s^22p^3(^4S^o)3s - 2s^22p^3(^4S^o)3p$	$^5S^o - ^5P$	2 – 1	A3
	500	1358.79	1358.81	913 112	– 986 706	$2s^22p^3(^4S^o)3s - 2s^22p^3(^4S^o)3p$	$^3S^o - ^3P$	1 – 2	A3
	100*bl*	1359.96	1359.97	913 112	– 986 643	$2s^22p^3(^4S^o)3s - 2s^22p^3(^4S^o)3p$	$^3S^o - ^3P$	1 – 1	A3
	2	1409.98	1409.98	993 570	– 1 064 493	$2s^22p^3(^2P^o)3s - 2s^22p^3(^2P^o)3p$	$^3P^o - ^3S$	0 – 1	A3
	20	1416.05	1416.05	993 874	– 1 064 493	$2s^22p^3(^2P^o)3s - 2s^22p^3(^2P^o)3p$	$^3P^o - ^3S$	2 – 1	A3
	200	1422.58	1422.58	961 100	– 1 031 395	$2s^22p^3(^2D^o)3s - 2s^22p^3(^2D^o)3p$	$^3D^o - ^3D$	3 – 3	A3
	10	1430.52	1430.51	961 100	– 1 031 005	$2s^22p^3(^2D^o)3s - 2s^22p^3(^2D^o)3p$	$^3D^o - ^3D$	2 – 2	A3
	10	1432.51	1432.50	961 100	– 1 030 908	$2s^22p^3(^2D^o)3s - 2s^22p^3(^2D^o)3p$	$^3D^o - ^3D$	1 – 1	A3
	400	1442.17	1442.17	970 340	– 1 039 680	$2s^22p^3(^2D^o)3s - 2s^22p^3(^2D^o)3p$	$^1D^o - ^1F$	2 – 3	A3
		Wavenumber (cm⁻¹)							
	M1	2731	2732	0	– 2 732	$2s^22p^4 - 2s^22p^4$	$^3P - ^3P$	2 – 1	G2

Al VII

N I isoelectronic sequence

Ground state $1s^22s^22p^3\ ^4S^\circ_{3/2}$

Ionization energy 1 949 900 ± 700 cm^{-1} (241.76 ± 0.09 eV)

We have tentatively included a number of lines classified by upper even-parity levels that were omitted in MZ79. We also list two lines near 280 Å classified as $2s2p^3(^5S^\circ)3p\ ^4P-2s2p^3(^5S^\circ)4d\ ^4D$ transitions [V2]; the level assignments here are in better agreement with the observed relative intensities than those in [V2].

Most of the levels were determined by using wavelength averages based on measurements from more than one reference [MZ79]. The calculated wavelengths may thus in general be somewhat more accurate than the observed values quoted from a single reference, even for lines not connected to other lines through the Ritz principle.

We obtained the above value for the Al VIII $2s^22p^2\ ^3P_0$ ionization limit using two types of formulae to fit the isoelectronic-sequence data (see results for S X by Martin, W. C., Zalubas, R., and Musgrove, A. [1990], J. Phys. Chem. Ref. Data **19**, 865). For comparison, we derived values for the $2s^22p^2\ ^3P_2$ limit by fitting Ritz series formulae to two (tentative) three-member series of Al VII, the $2s^22p^2(^3P)nd\ ^2F^\circ_{7/2}$ and $(^3P)ns\ ^4P_{5/2}$ series; these gave $^3P_2$ limit values respectively 1270 and 2710 cm^{-1} lower than the $^3P_2$ value consistent with the above $^3P_0$ ionization energy. Additional research is needed on Al VII and other spectra of this sequence in order to decide amongst various possible explanations of such discrepancies.

References

F2 Ferner, E. [1948], Ark. Mat. Astron. Fys. **36**, 1–65.

K4 Kononov, E. Ya., and Koshelev, K. N. [1970], Opt. Spectrosc. **29**, 115–116.

S4 Sandlin, G. D., and Tousey, R. [1979], Astrophys. J. **227**, L107–L109.

V2 Valero, F. P. J. [1975], J. Opt. Soc. Am. **65**, 197–198.

Al VII

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	1*g*	58.750	58.751?	0	1 702 100?	$2s^22p^3-2s^22p^2(^3P)5s$	$^4S^\circ-^4P$	3/2 – 5/2	V2
	10	59.827	59.824?	62 369	1 733 940?	$2s^22p^3-2s^22p^2(^3P)5d$	$^2D^\circ-^2F$	5/2 – 7/2	V2
	10	59.911	59.911?	62 313	1 731 450?	$2s^22p^3-2s^22p^2(^3P)5d$	$^2D^\circ-^2F$	3/2 – 5/2	V2
	12*g*	62.292	62.299?	0	1 605 150?	$2s^22p^3-2s^22p^2(^3P)4d$	$^4S^\circ-^2F$	3/2 – 5/2	V2
	8*g*	62.474	62.484?	0	1 600 400?	$2s^22p^3-2s^22p^2(^3P)4d$	$^4S^\circ-^2P$	3/2 – 3/2	F2
	65	63.005	63.008	62 369	1 649 470	$2s^22p^3-2s^22p^2(^1D)4d$?	$^2D^\circ-^2D$?	5/2 – 5/2?	V2
	65	63.056	63.051	62 313	1 648 330	$2s^22p^3-2s^22p^2(^1D)4d$?	$^2D^\circ-^2D$?	3/2 – 3/2?	V2
	8	64.325	64.325	94 869	1 649 470	$2s^22p^3-2s^22p^2(^1D)4d$?	$^2P^\circ-^2D$?	3/2 – 5/2?	F2
	25	64.358	64.361	94 603	1 648 330	$2s^22p^3-2s^22p^2(^1D)4d$?	$^2P^\circ-^2D$?	1/2 – 3/2?	F2
	1	64.481	64.482	62 369	1 613 180	$2s^22p^3-2s^22p^2(^3P)4d$?	$^2D^\circ-^2D$?	5/2 – 5/2?	V2
	1	64.516	64.510	62 313	1 612 450	$2s^22p^3-2s^22p^2(^3P)4d$?	$^2D^\circ-^2D$?	3/2 – 3/2?	V2
	12	64.698	64.701?	62 369	1 607 950?	$2s^22p^3-2s^22p^2(^3P)4d$	$^2D^\circ-^2F$	5/2 – 7/2	V2
	8*g*	64.815	64.809?	0	1 543 000?	$2s^22p^3-2s^22p^2(^3P)4s$	$^4S^\circ-^4P$	3/2 – 5/2	F2
	9	64.816	64.816?	62 313	1 605 150?	$2s^22p^3-2s^22p^2(^3P)4d$	$^2D^\circ-^2F$	3/2 – 5/2	V2
	12	65.020	65.016?	62 313	1 600 400?	$2s^22p^3-2s^22p^2(^3P)4d$	$^2D^\circ-^2P$	3/2 – 3/2	V2
			65.018?	62 369	1 600 400?	$2s^22p^3-2s^22p^2(^3P)4d$	$^2D^\circ-^2P$	5/2 – 3/2	
	18	65.862	65.863	94 869	1 613 180	$2s^22p^3-2s^22p^2(^3P)4d$?	$^2P^\circ-^2D$?	3/2 – 5/2?	V2
	50	65.883	65.883	94 603	1 612 450	$2s^22p^3-2s^22p^2(^3P)4d$?	$^2P^\circ-^2D$?	1/2 – 3/2?	V2
	27	66.409	66.410?	94 603	1 600 400?	$2s^22p^3-2s^22p^2(^3P)4d$	$^2P^\circ-^2P$	1/2 – 3/2	V2
	60	68.534	68.530	280 200	1 739 420	$2s2p^4-2s2p^3(^5S^\circ)4d$	$^4P-^4D^\circ$	5/2 – 7/2	V2
	64	68.626	68.629	282 670	1 739 780	$2s2p^4-2s2p^3(^5S^\circ)4d$	$^4P-^4D^\circ$	3/2 – 5/2	V2
	30	68.675	68.678?	283 970	1 740 040?	$2s2p^4-2s2p^3(^5S^\circ)4d$	$^4P-^4D^\circ$	1/2 – 3/2	V2
	195*g*	72.282	72.278	0	1 383 540	$2s^22p^3-2s2p^3(^5S^\circ)3p$	$^4S^\circ-^4P$	3/2 – 5/2	V2
	74	74.099	74.095	62 313	1 411 930	$2s^22p^3-2s^22p^2(^1S)3d$?	$^2D^\circ-^2D$?	3/2 – 3/2	V2
			74.098	62 369	1 411 930	$2s^22p^3-2s^22p^2(^1S)3d$?	$^2D^\circ-^2D$?	5/2 – 5/2	
	50*g*	74.321	74.333	0	1 345 300	$2s^22p^3-2s^22p^2(^3P)3d$	$^4S^\circ-^2D$	3/2 – 3/2	F2

Al VII – Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	215g	75.281	75.276	0	1 328 450	$2s^22p^3-2s^22p^2(^3P)3d$	$^4S^o-^4P$	3/2 – 1/2	V2
	250g	75.313	75.307	0	1 327 890	$2s^22p^3-2s^22p^2(^3P)3d$	$^4S^o-^4P$	3/2 – 3/2	V2
	227g	75.367	75.364	0	1 326 900	$2s^22p^3-2s^22p^2(^3P)3d$	$^4S^o-^4P$	3/2 – 5/2	V2
	227g	75.544	75.538?	0	1 323 830?	$2s^22p^3-2s^22p^2(^3P)3d$	$^4S^o-^4D$	3/2 –	V2
	100	75.808	75.808	280 200	1 599 320	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4S^o$?	5/2 – 3/2	V2
	195	75.850	75.854?	62 313	1 380 640?	$2s^22p^3-2s^22p^2(^1D)3d$	$^2D^o-^2P$	3/2 – 3/2	F2
			75.857?	62 369	1 380 640?	$2s^22p^3-2s^22p^2(^1D)3d$	$^2D^o-^2P$	5/2 – 3/2	
	195	75.876	75.869	280 200	1 598 270	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4D^o$?	5/2 – 7/2	V2
	262	75.903	75.911	94 603	1 411 930	$2s^22p^3-2s^22p^2(^1S)3d$?	$^2P^o-^2D$?	1/2 – 3/2	V2
	185	75.926	75.927	94 869	1 411 930	$2s^22p^3-2s^22p^2(^1S)3d$?	$^2P^o-^2D$?	3/2 – 5/2	V2
		75.946	75.950	282 670	1 599 320	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4S^o$?	3/2 – 3/2	V2
	205	76.009	76.011	282 670	1 598 270	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4D^o$?	3/2 – 5/2	V2
	157	76.022	76.025	283 970	1 599 320	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4S^o$?	1/2 – 3/2	V2
	125	76.090	76.086	283 970	1 598 270	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4D^o$?	1/2 – 3/2	V2
	205	76.226	76.222	280 200	1 592 150	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4P^o$?	5/2 – 3/2	V2
	195	76.262	76.257	280 200	1 591 560	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4P^o$?	5/2 – 5/2	V2
	157	76.344	76.343?	282 670	1 592 540?	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4P^o$?	3/2 – 1/2	V2
	140	76.366	76.366	282 670	1 592 150	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4P^o$?	3/2 – 3/2	V2
	300	76.386	76.384	62 369	1 371 550	$2s^22p^3-2s^22p^2(^1D)3d$	$^2D^o-^2D$	5/2 – 5/2	V2
	215	76.400	76.401	282 670	1 591 560	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4P^o$?	3/2 – 5/2	V2
	288	76.422	76.415?	62 313	1 370 950?	$2s^22p^3-2s^22p^2(^1D)3d$	$^2D^o-^2D$	3/2 – 3/2	F2
	215	76.440	76.442	283 970	1 592 150	$2s2p^4-2s2p^3(^3D^o)3d$?	$^4P-^4P^o$?	1/2 – 3/2	V2
	215	76.543	76.549	62 313	1 368 670	$2s^22p^3-2s^22p^2(^1D)3d$	$^2D^o-^2F$	3/2 – 5/2	F2
	225	76.582	76.578	62 369	1 368 230	$2s^22p^3-2s^22p^2(^1D)3d$	$^2D^o-^2F$	5/2 – 7/2	V2
	91	77.778	77.774?	94 869	1 380 640?	$2s^22p^3-2s^22p^2(^1D)3d$	$^2P^o-^2P$	3/2 – 3/2	V2
	104	77.809	77.808?	94 603	1 379 820?	$2s^22p^3-2s^22p^2(^1D)3d$	$^2P^o-^2P$	1/2 – 1/2	V2
	250	77.906	77.900	62 369	1 346 070	$2s^22p^3-2s^22p^2(^3P)3d$	$^2D^o-^2D$	5/2 – 5/2	V2
	166	77.945	77.943	62 313	1 345 300	$2s^22p^3-2s^22p^2(^3P)3d$	$^2D^o-^2D$	3/2 – 3/2	F2
	345	78.329	78.328	94 869	1 371 550	$2s^22p^3-2s^22p^2(^1D)3d$	$^2P^o-^2D$	3/2 – 5/2	V2
	288	78.343	78.349?	94 603	1 370 950?	$2s^22p^3-2s^22p^2(^1D)3d$	$^2P^o-^2D$	1/2 – 3/2	V2
	262	78.365	78.365?	94 869	1 370 950?	$2s^22p^3-2s^22p^2(^1D)3d$	$^2P^o-^2D$	3/2 – 3/2	V2
	314	79.022	79.018	62 369	1 327 910	$2s^22p^3-2s^22p^2(^3P)3d$	$^2D^o-^2F$	5/2 – 7/2	V2
	300	79.204	79.201	62 313	1 324 930	$2s^22p^3-2s^22p^2(^3P)3d$	$^2D^o-^2F$	3/2 – 5/2	V2
	64	79.637	79.637	62 313	1 318 010	$2s^22p^3-2s^22p^2(^3P)3d$	$^2D^o-^2P$	3/2 – 1/2	V2
	215	79.692	79.691	62 369	1 317 220	$2s^22p^3-2s^22p^2(^3P)3d$	$^2D^o-^2P$	5/2 – 3/2	V2
	390	79.928	79.923	94 869	1 346 070	$2s^22p^3-2s^22p^2(^3P)3d$	$^2P^o-^2D$	3/2 – 5/2	V2
	390	79.960	79.955	94 603	1 345 300	$2s^22p^3-2s^22p^2(^3P)3d$	$^2P^o-^2D$	1/2 – 3/2	V2
	300	79.972	79.972	94 869	1 345 300	$2s^22p^3-2s^22p^2(^3P)3d$	$^2P^o-^2D$	3/2 – 3/2	V2
	50	81.176	81.167	94 869	1 326 900	$2s^22p^3-2s^22p^2(^3P)3d$	$^2P^o-^4P$	3/2 – 5/2	F2
	262	81.741	81.739	94 603	1 318 010	$2s^22p^3-2s^22p^2(^3P)3d$	$^2P^o-^2P$	1/2 – 1/2	V2
	205	81.774	81.757	94 869	1 318 010	$2s^22p^3-2s^22p^2(^3P)3d$	$^2P^o-^2P$	3/2 – 1/2	V2
	365	81.794	81.792	94 603	1 317 220	$2s^22p^3-2s^22p^2(^3P)3d$	$^2P^o-^2P$	1/2 – 3/2	V2
	380	81.809	81.810	94 869	1 317 220	$2s^22p^3-2s^22p^2(^3P)3d$	$^2P^o-^2P$	3/2 – 3/2	V2
	512	83.833	83.832	280 200	1 473 060	$2s2p^4-2s2p^3(^5S^o)3d$	$^4P-^4D^o$	5/2 – 7/2	V2
	475	84.005	84.006	282 670	1 473 060	$2s2p^4-2s2p^3(^5S^o)3d$	$^4P-^4D^o$	3/2 – 5/2	V2
	422	84.095	84.098	283 970	1 473 060	$2s2p^4-2s2p^3(^5S^o)3d$	$^4P-^4D^o$	1/2 – 3/2	V2
	118	86.666	86.668	94 603	1 248 430	$2s^22p^3-2s^22p^2(^1S)3s$	$^2P^o-^2S$	1/2 – 1/2	V2
	166	86.685	86.688	94 869	1 248 430	$2s^22p^3-2s^22p^2(^1S)3s$	$^2P^o-^2S$	3/2 – 1/2	V2
	475g	86.884	86.885	0	1 150 950	$2s^22p^3-2s^22p^2(^3P)3s$	$^4S^o-^4P$	3/2 – 5/2	V2
	456g	87.058	87.059	0	1 148 650	$2s^22p^3-2s^22p^2(^3P)3s$	$^4S^o-^4P$	3/2 – 3/2	V2
	422g	87.165	87.169	0	1 147 200	$2s^22p^3-2s^22p^2(^3P)3s$	$^4S^o-^4P$	3/2 – 1/2	V2
	515	88.027	88.027	62 313	1 198 330	$2s^22p^3-2s^22p^2(^1D)3s$	$^2D^o-^2D$	3/2 – 3/2	V2
			88.031	62 369	1 198 330	$2s^22p^3-2s^22p^2(^1D)3s$	$^2D^o-^2D$	5/2 – 5/2	
	515	90.547	90.551	62 369	1 166 720	$2s^22p^3-2s^22p^2(^3P)3s$	$^2D^o-^2P$	5/2 – 3/2	V2
	185	90.596	90.602	94 603	1 198 330	$2s^22p^3-2s^22p^2(^1D)3s$	$^2P^o-^2D$	1/2 – 3/2	V2

Al VII — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	185	90.627	90.624	94 869	– 1 198 330	$2s^22p^3 - 2s^22p^2(^1D)3s$	$^2P^o - ^2D$	3/2 – 5/2	V2
	195	90.772	90.775	62 313	– 1 163 940	$2s^22p^3 - 2s^22p^2(^3P)3s$	$^2D^o - ^2P$	3/2 – 1/2	F2
	420	93.275	93.273	94 603	– 1 166 720	$2s^22p^3 - 2s^22p^2(^3P)3s$	$^2P^o - ^2P$	1/2 – 3/2	V2
	550	93.298	93.297	94 869	– 1 166 720	$2s^22p^3 - 2s^22p^2(^3P)3s$	$^2P^o - ^2P$	3/2 – 3/2	V2
	420	93.517	93.516	94 603	– 1 163 940	$2s^22p^3 - 2s^22p^2(^3P)3s$	$^2P^o - ^2P$	1/2 – 1/2	V2
	343	93.535	93.539	94 869	– 1 163 940	$2s^22p^3 - 2s^22p^2(^3P)3s$	$^2P^o - ^2P$	3/2 – 1/2	V2
	440	95.975	95.974	280 200	– 1 322 150	$2s2p^4 - 2s2p^3(^5S^o)3s$	$^4P - ^4S^o$	5/2 – 3/2	V2
	375	96.207	96.202	282 670	– 1 322 150	$2s2p^4 - 2s2p^3(^5S^o)3s$	$^4P - ^4S^o$	3/2 – 3/2	V2
	227	96.327	96.322	283 970	– 1 322 150	$2s2p^4 - 2s2p^3(^5S^o)3s$	$^4P - ^4S^o$	1/2 – 3/2	V2
	100	239.030	239.036	62 313	– 480 660	$2s^22p^3 - 2s2p^4$	$^2D^o - ^2P$	3/2 – 1/2	V2
	200	240.770	240.778	62 369	– 477 690	$2s^22p^3 - 2s2p^4$	$^2D^o - ^2P$	5/2 – 3/2	V2
	262	259.036	259.029	94 603	– 480 660	$2s^22p^3 - 2s2p^4$	$^2P^o - ^2P$	1/2 – 1/2	V2
	345	259.207	259.208	94 869	– 480 660	$2s^22p^3 - 2s2p^4$	$^2P^o - ^2P$	3/2 – 1/2	V2
	330	261.044	261.037	94 603	– 477 690	$2s^22p^3 - 2s2p^4$	$^2P^o - ^2P$	1/2 – 3/2	V2
	495	261.219	261.219	94 869	– 477 690	$2s^22p^3 - 2s2p^4$	$^2P^o - ^2P$	3/2 – 3/2	V2
	510	278.982	278.973	94 603	– 453 060	$2s^22p^3 - 2s2p^4$	$^2P^o - ^2S$	1/2 – 1/2	V2
	440	279.187	279.181	94 869	– 453 060	$2s^22p^3 - 2s2p^4$	$^2P^o - ^2S$	3/2 – 1/2	V2
	100	280.745	280.741	1 383 580	– 1 739 780	$2s2p^3(^5S^o)3p - 2s2p^3(^5S^o)4d$	$^4P - ^4D^o$	3/2 – 5/2	V2
	150	280.994	280.994	1 383 540	– 1 739 420	$2s2p^3(^5S^o)3p - 2s2p^3(^5S^o)4d$	$^4P - ^4D^o$	5/2 – 7/2	V2
	315	282.660	282.654	385 910	– 739 700	$2s2p^4 - 2p^5$	$^2D - ^2P^o$	3/2 – 1/2	V2
	360	285.81	285.804	385 860	– 735 750	$2s2p^4 - 2p^5$	$^2D - ^2P^o$	5/2 – 3/2	K4
	420	309.023	309.026	62 313	– 385 910	$2s^22p^3 - 2s2p^4$	$^2D^o - ^2D$	3/2 – 3/2	V2
	475	309.072	{ 309.074	62 313	– 385 860	$2s^22p^3 - 2s2p^4$	$^2D^o - ^2D$	3/2 – 5/2	V2
			{ 309.080	62 369	– 385 910	$2s^22p^3 - 2s2p^4$	$^2D^o - ^2D$	5/2 – 3/2	
	375	309.121	309.128	62 369	– 385 860	$2s^22p^3 - 2s2p^4$	$^2D^o - ^2D$	5/2 – 5/2	V2
	125	343.290	343.280	94 603	– 385 910	$2s^22p^3 - 2s2p^4$	$^2P^o - ^2D$	1/2 – 3/2	V2
	160	343.641	343.653	94 869	– 385 860	$2s^22p^3 - 2s2p^4$	$^2P^o - ^2D$	3/2 – 5/2	V2
	75*g*	352.145	352.150	0	– 283 970	$2s^22p^3 - 2s2p^4$	$^4S^o - ^4P$	3/2 – 1/2	V2
	140*g*	353.769	353.769	0	– 282 670	$2s^22p^3 - 2s2p^4$	$^4S^o - ^4P$	3/2 – 3/2	V2
	20*g*	356.880	356.888	0	– 280 200	$2s^22p^3 - 2s2p^4$	$^4S^o - ^4P$	3/2 – 5/2	V2
	55	381.674	381.665	477 690	– 739 700	$2s2p^4 - 2p^5$	$^2P - ^2P^o$	3/2 – 1/2	V2
	95	386.03	386.041	480 660	– 739 700	$2s2p^4 - 2p^5$	$^2P - ^2P^o$	1/2 – 1/2	K4
	125	387.51	387.507	477 690	– 735 750	$2s2p^4 - 2p^5$	$^2P - ^2P^o$	3/2 – 3/2	K4
	45	392.00	392.018	480 660	– 735 750	$2s2p^4 - 2p^5$	$^2P - ^2P^o$	1/2 – 3/2	K4
	M1		1054.08	0	– 94 869	$2s^22p^3 - 2s^22p^3$	$^4S^o - ^2P^o$	3/2 – 3/2	
	M1		1057.05	0	– 94 603	$2s^22p^3 - 2s^22p^3$	$^4S^o - ^2P^o$	3/2 – 1/2	
	M1		1603.36	0	– 62 369	$2s^22p^3 - 2s^22p^3$	$^4S^o - ^2D^o$	3/2 – 5/2	
	M1	1604.80	1604.80	0	– 62 313	$2s^22p^3 - 2s^22p^3$	$^4S^o - ^2D^o$	3/2 – 3/2	S4
		Air Wavelength (Å)							
	M1		3070.7	62 313	– 94 869	$2s^22p^3 - 2s^22p^3$	$^2D^o - ^2P^o$	3/2 – 3/2	
	M1		3076.0	62 369	– 94 869	$2s^22p^3 - 2s^22p^3$	$^2D^o - ^2P^o$	5/2 – 3/2	
	M1		3096.0	62 313	– 94 603	$2s^22p^3 - 2s^22p^3$	$^2D^o - ^2P^o$	3/2 – 1/2	

C I isoelectronic sequence

Ground state $1s^22s^22p^2\ ^3P_0$

Ionization energy 2 295 900±500 cm^{-1} (284.66±0.06 eV)

Denne and Hinnov classified the $2s^22p^2\ ^3P-2s2p^3\ ^5S^\circ$ lines at 756.8 and 772.7 Å and thus established the triplet-quintet connection within about ±30 cm^{-1} [D1]. We have reevaluated the quintet levels using their results.

We increased the values of the singlet levels given in [MZ79] by 30 cm^{-1} to obtain better agreement with Edlén's [1985] most recent estimate for the triplet-singlet connection. The value of the $2s^22p^2\ ^1D_2$ level tentatively suggested in [D1] would raise the singlet system about 270 cm^{-1} above the estimated position adopted here; the singlet levels are given with an unknown correction "$+x$" to indicate the lack of an experimental confirmation of the connection.

We include lines classified by more than twenty of Ferner's high levels that were omitted in MZ79, the levels being given here as questionable.

Calculated wavelengths are listed for a number of intersystem and magnetic-dipole transitions that have not yet been measured. It is hoped that the absolute value of the unknown quantity "x" is small enough so that the predicted singlet-triplet intercombination wavelengths are useful.

We obtained a value of 2 296 130 cm^{-1} for the ionization energy by applying a semi-empirical isoelectronic correction formula to a theoretically calculated value. Edlén's [1971] ionization-energy formula for this sequence, also based on an isoelectronic treatment of the available data, gives a value of 2 295 650 cm^{-1}. The above value is based on these two results.

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Al VIII

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	10	53.785	53.785?	133 840	– 1 993 090?	$2s2p^3 - 2s2p^2(^4P)4d$	$^5S^\circ - ^5P$	2 – 1	F2
	10	53.800	53.800?	133 840	– 1 992 580?	$2s2p^3 - 2s2p^2(^4P)4d$	$^5S^\circ - ^5P$	2 – 2	F2
	10	53.823	53.823?	133 840	– 1 991 780?	$2s2p^3 - 2s2p^2(^4P)4d$	$^5S^\circ - ^5P$	2 – 3	F2
	200g	54.217	54.217?	1 710	– 1 846 150?	$2s^22p^2 - 2s^22p4d$	$^3P - ^3D^\circ$	1 – 2	F2
	200g	54.258	54.258?	4 420	– 1 847 470?	$2s^22p^2 - 2s^22p4d$	$^3P - ^3D^\circ$	2 – 3	F2
	10	57.553	57.553?	262 180	– 1 999 710?	$2s2p^3 - 2s2p^2(^4P)4d$	$^3D^\circ - ^3F$	3 – 4	F2
	10	57.624	57.624?	262 270	– 1 997 660?	$2s2p^3 - 2s2p^2(^4P)4d$	$^3D^\circ - ^3F$	2 – 3	F2
	150	61.694	61.694?	46 720+x	– 1 667 620+x?	$2s^22p^2 - 2s2p^2(^2D)3p$	$^1D - ^1D^\circ$	2 – 2	F2
	100	62.016	62.016?	46 720+x	– 1 659 210+x?	$2s^22p^2 - 2s2p^2(^2D)3p$	$^1D - ^1F^\circ$	2 – 3	F2
	10	63.203	{ 63.200	262 180	– 1 844 470	$2s2p^3 - 2s2p^2(^2P)3d$	$^3D^\circ - ^3P$?	3 – 2?	F2
			{ 63.203	262 270	– 1 844 470	$2s2p^3 - 2s2p^2(^2P)3d$	$^3D^\circ - ^3P$?	2 – 2?	
			{ 63.206	262 330	– 1 844 470	$2s2p^3 - 2s2p^2(^2P)3d$	$^3D^\circ - ^3P$?	1 – 2?	
	100	63.714	{ 63.714?	262 180	– 1 831 700?	$2s2p^3 - 2s2p^2(^2P)3d$	$^3D^\circ - ^3F$	3 –	F2
			{ 63.717?	262 270	– 1 831 700?	$2s2p^3 - 2s2p^2(^2P)3d$	$^3D^\circ - ^3F$	2 –	
			{ 63.720?	262 330	– 1 831 700?	$2s2p^3 - 2s2p^2(^2P)3d$	$^3D^\circ - ^3F$	1 –	
	10g	63.933	63.933?	0	– 1 564 140?	$2s^22p^2 - 2s2p^2(^4P)3p$	$^3P - ^3D^\circ$	0 – 1	F2
	150g	63.965	63.970?	1 710	– 1 564 950?	$2s^22p^2 - 2s2p^2(^4P)3p$	$^3P - ^3D^\circ$	1 – 2	F2
	200g	64.004	64.004?	4 420	– 1 566 820?	$2s^22p^2 - 2s2p^2(^4P)3p$	$^3P - ^3D^\circ$	2 – 3	F2
	10g	64.086	64.081?	4 420	– 1 564 950?	$2s^22p^2 - 2s2p^2(^4P)3p$	$^3P - ^3D^\circ$	2 – 2	F2
	10	65.128	65.131	309 110	– 1 844 470	$2s2p^3 - 2s2p^2(^2P)3d$	$^3P^\circ - ^3P$?	– 2?	F2
	10	65.298	65.298?	309 110	– 1 840 550?	$2s2p^3 - 2s2p^2(^2P)3d$	$^3P^\circ - ^3D$		F2
	50g	65.381	65.379	1 710	– 1 531 250	$2s^22p^2 - 2s2p^2(^4P)3p$	$^3P - ^3S^\circ$?	1 – 1?	F2

Al VIII — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	50*g*	65.494	65.495	4 420	– 1 531 250	$2s^22p^2 - 2s2p^2(^4P)3p$	$^3P - ^3S^o$?	2 – 1?	F2
	60	66.321	66.321?	309 110	– 1 816 930?	$2s2p^3 - 2s2p^2(^2S)3d$	$^3P^o - ^3D$	2 – 3	F2
	10	66.363	66.363?	309 110	– 1 815 970?	$2s2p^3 - 2s2p^2(^2S)3d$	$^3P^o - ^3D$	– 2	F2
	150	66.704	66.704	133 840	– 1 633 000	$2s2p^3 - 2s2p^2(^4P)3d$	$^5S^o - ^5P$	2 – 1	F2
	200	66.731	66.731	133 840	– 1 632 390	$2s2p^3 - 2s2p^2(^4P)3d$	$^5S^o - ^5P$	2 – 2	F2
	350	66.771	66.771	133 840	– 1 631 500	$2s2p^3 - 2s2p^2(^4P)3d$	$^5S^o - ^5P$	2 – 3	F2
	10*g*	67.044	67.044	0	– 1 491 550	$2s^22p^2 - 2s^22p3d$	$^3P - ^3P^o$	0 – 1	F2
	100*g*	67.096	67.096	1 710	– 1 492 110	$2s^22p^2 - 2s^22p3d$	$^3P - ^3P^o$	1 – 0	F2
	100*g*	67.121	67.121	1 710	– 1 491 550	$2s^22p^2 - 2s^22p3d$	$^3P - ^3P^o$	1 – 1	F2
	10*g*	67.166	67.165	1 710	– 1 490 570	$2s^22p^2 - 2s^22p3d$	$^3P - ^3P^o$	1 – 2	F2
	150*g*	67.244	67.244	4 420	– 1 491 550	$2s^22p^2 - 2s^22p3d$	$^3P - ^3P^o$	2 – 1	F2
	500*g*	67.288	67.288	4 420	– 1 490 570	$2s^22p^2 - 2s^22p3d$	$^3P - ^3P^o$	2 – 2	F2
	250*g*	67.360	67.360	0	– 1 484 570	$2s^22p^2 - 2s^22p3d$	$^3P - ^3D^o$	0 – 1	F2
	500*g*	67.408	67.407	1 710	– 1 485 240	$2s^22p^2 - 2s^22p3d$	$^3P - ^3D^o$	1 – 2	F2
			67.409?	262 180	– 1 745 660?	$2s2p^3 - 2s2p^2(^2D)3d$	$^3D^o - ^3P$	3 – 2	
	50*g*	67.437	67.437	1 710	– 1 484 570	$2s^22p^2 - 2s^22p3d$	$^3P - ^3D^o$	1 – 1	F2
	600*g*	67.464	67.464	4 420	– 1 486 690	$2s^22p^2 - 2s^22p3d$	$^3P - ^3D^o$	2 – 3	F2
	10*g*	67.529	67.530	4 420	– 1 485 240	$2s^22p^2 - 2s^22p3d$	$^3P - ^3D^o$	2 – 2	F2
	150	67.565	67.561	262 180	– 1 742 330	$2s2p^3 - 2s2p^2(^2D)3d$	$^3D^o - ^3D$?	3 –	F2
			67.565	262 270	– 1 742 330	$2s2p^3 - 2s2p^2(^2D)3d$	$^3D^o - ^3D$?	2 –	
			67.568	262 330	– 1 742 330	$2s2p^3 - 2s2p^2(^2D)3d$	$^3D^o - ^3D$?	1 –	
	500	67.946	67.943?	262 180	– 1 734 000?	$2s2p^3 - 2s2p^2(^2D)3d$	$^3D^o - ^3F$	3 –	F2
			67.947?	262 270	– 1 734 000?	$2s2p^3 - 2s2p^2(^2D)3d$	$^3D^o - ^3F$	2 –	
			67.950?	262 330	– 1 734 000?	$2s2p^3 - 2s2p^2(^2D)3d$	$^3D^o - ^3F$	1 –	
	750	68.375	68.375	46 720+x	– 1 509 240+x	$2s^22p^2 - 2s^22p3d$	$^1D - ^1F^o$	2 – 3	F2
	50	68.825	68.825?	309 110	– 1 762 070?	$2s2p^3 - 2s2p^2(^2D)3d$	$^3P^o - ^3S$	– 1	F2
	50	69.420	69.420?	309 110	– 1 749 620?	$2s2p^3 - 2s2p^2(^2D)3d$	$^3P^o - ^3P$	1 – 0	F2
	100	69.502	69.502?	309 110	– 1 747 920?	$2s2p^3 - 2s2p^2(^2D)3d$	$^3P^o - ^3P$	– 1	F2
	200	69.611	69.611?	309 110	– 1 745 660?	$2s2p^3 - 2s2p^2(^2D)3d$	$^3P^o - ^3P$	2 – 2	F2
	150	69.773	69.773	309 110	– 1 742 330	$2s2p^3 - 2s2p^2(^2D)3d$	$^3P^o - ^3D$?		F2
	300	70.161	70.161	46 720+x	– 1 472 010+x	$2s^22p^2 - 2s^22p3d$	$^1D - ^1D^o$	2 – 2	F2
	200	70.323	70.323	46 720+x	– 1 468 730+x	$2s^22p^2 - 2s^22p3d$	$^1D - ^3F^o$	2 – 2	F2
	250	70.727	70.727	96 260+x	– 1 510 150+x	$2s^22p^2 - 2s^22p3d$	$^1S - ^1P^o$	0 – 1	F2
	135	71.238	71.238	262 180	– 1 665 920	$2s2p^3 - 2s2p^2(^4P)3d$	$^3D^o - ^3D$?	3 – 3?	V1
	125	71.274	71.272	262 270	– 1 665 350	$2s2p^3 - 2s2p^2(^4P)3d$	$^3D^o - ^3D$?	2 – 2?	V1
	70	71.025	71.034?	444 570+x	– 1 840 550?	$2s2p^3 - 2s2p^2(^2P)3d$	$^1P^o - ^3D$	1 –	F2
	200	72.223	72.223?	262 180	– 1 646 780?	$2s2p^3 - 2s2p^2(^4P)3d$	$^3D^o - ^3F$	3 – 4	F2
	200	72.324	72.324?	262 270	– 1 644 940?	$2s2p^3 - 2s2p^2(^4P)3d$	$^3D^o - ^3F$	2 – 3	F2
	150	72.401	72.401?	262 330	– 1 643 530?	$2s2p^3 - 2s2p^2(^4P)3d$	$^3D^o - ^3F$	1 – 2	F2
	150	73.703	73.702	309 110	– 1 665 920	$2s2p^3 - 2s2p^2(^4P)3d$	$^3P^o - ^3D$?	2 – 3?	F2
	100	73.733	73.733	309 110	– 1 665 350	$2s2p^3 - 2s2p^2(^4P)3d$	$^3P^o - ^3D$?	– 2?	F2
	200	73.879	73.877	309 110	– 1 662 720	$2s2p^3 - 2s2p^2(^2S)3s$	$^3P^o - ^3S$?	– 1?	F2
	120	74.016	74.025?	397 020+x	– 1 747 920?	$2s2p^3 - 2s2p^2(^2D)3d$	$^1D^o - ^3P$	2 – 1	F2
	200	74.841	74.841	133 840	– 1 470 010	$2s2p^3 - 2s2p^2(^4P)3s$	$^5S^o - ^5P$	2 – 3	F2
	150	74.965	74.965	133 840	– 1 467 800	$2s2p^3 - 2s2p^2(^4P)3s$	$^5S^o - ^5P$	2 – 2	F2
	50	75.058	75.058	133 840	– 1 466 140	$2s2p^3 - 2s2p^2(^4P)3s$	$^5S^o - ^5P$	2 – 1	F2
	70	75.397	75.397?	309 110	– 1 635 420?	$2s2p^3 - 2s2p^2(^4P)3d$	$^3P^o - ^3P$	– 1	F2
	200	75.488	75.488?	309 110	– 1 633 820?	$2s2p^3 - 2s2p^2(^4P)3d$	$^3P^o - ^3P$	– 2	F2
	150	75.577	75.570	309 110	– 1 632 390	$2s2p^3 - 2s2p^2(^4P)3d$	$^3P^o - ^5P$	– 2	F2
			75.572	262 180	– 1 585 420	$2s2p^3 - 2s2p^2(^2D)3s$	$^3D^o - ^3D$	3 –	
			75.577	262 270	– 1 585 420	$2s2p^3 - 2s2p^2(^2D)3s$	$^3D^o - ^3D$	2 –	
			75.581	262 330	– 1 585 420	$2s2p^3 - 2s2p^2(^2D)3s$	$^3D^o - ^3D$	1 –	

Al VIII — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	100g	75.623	75.621	309 110	1 631 500	$2s2p^3 - 2s2p^2(^4P)3d$	$^3P^o - ^5P$	2 – 3	
			75.623	1 710	1 324 060	$2s^22p^2 - 2s^22p3s$	$^3P - ^3P^o$	1 – 2	F2
	50g	75.734	75.732	0	1 320 440	$2s^22p^2 - 2s^22p3s$	$^3P - ^3P^o$	0 – 1	F2
	250g	75.778	75.778	4 420	1 324 060	$2s^22p^2 - 2s^22p3s$	$^3P - ^3P^o$	2 – 2	F2
	100g	75.894	75.894	1 710	1 319 340	$2s^22p^2 - 2s^22p3s$	$^3P - ^3P^o$	1 – 0	F2
	50g	75.985	75.987	4 420	1 320 440	$2s^22p^2 - 2s^22p3s$	$^3P - ^3P^o$	2 – 1	F2
	200	76.853	76.859?	444 570+x	1 745 660?	$2s2p^3 - 2s2p^2(^2D)3d$	$^1P^o - ^3P$	1 – 2	F2
	300	77.605	77.605	46 720+x	1 335 300+x	$2s^22p^2 - 2s^22p3s$	$^1D - ^1P^o$	2 – 1	F2
	1000	78.351	78.351	309 110	1 585 420	$2s2p^3 - 2s2p^2(^2D)3s$	$^3P^o - ^3D$		F2
	150	78.508	78.510	46 720+x	1 320 440	$2s^22p^2 - 2s^22p3s$	$^1D - ^3P^o$	2 – 1	F2
	100	78.836	78.844	133 840	1 402 160	$2s2p^3 - 2s^22p3p$	$^5S^o - ^3S$	2 – 1	F2
	120	79.455	79.458	404 200	1 662 720	$2s2p^3 - 2s2p^2(^2S)3s$	$^3S^o - ^3S?$	1 – 1?	F2
	10	80.320	80.319	262 180	1 507 210	$2s2p^3 - 2s2p^2(^4P)3s$	$^3D^o - ^3P$	3 – 2?	F2
	10	80.483	80.482	262 270	1 504 780	$2s2p^3 - 2s2p^2(^4P)3s$	$^3D^o - ^3P$	2 – 1?	F2
	100	80.704	80.708	96 260+x	1 335 300+x	$2s^22p^2 - 2s^22p3s$	$^1S - ^1P^o$	0 – 1	F2
	10	83.335	83.322?	647 310	1 847 470?	$2p^4 - 2s^22p4d$	$^1D - ^3D^o$	2 – 3	F2
	50	83.465	83.465	309 110	1 507 210	$2s2p^3 - 2s2p^2(^4P)3s$	$^3P^o - ^3P$	– 2?	F2
	10	83.635	83.635	309 110	1 504 780	$2s2p^3 - 2s2p^2(^4P)3s$	$^3P^o - ^3P$	– 1?	F2
	100	86.427	86.428	309 110	1 466 140	$2s2p^3 - 2s2p^2(^4P)3s$	$^3P^o - ^5P$	– 1	F2
	50	91.487	91.487	309 110	1 402 160	$2s2p^3 - 2s^22p3p$	$^3P^o - ^3S$	– 1	F2
	50	113.140	113.193	608 100	1 491 550	$2p^4 - 2s^22p3d$	$^3P - ^3P^o$	2 – 1	F2
	10g	247.401	247.402	0	404 200	$2s^22p^2 - 2s2p^3$	$^3P - ^3S^o$	0 – 1	V1
	55g	248.456	248.453	1 710	404 200	$2s^22p^2 - 2s2p^3$	$^3P - ^3S^o$	1 – 1	V1
	100g	250.139	250.138	4 420	404 200	$2s^22p^2 - 2s2p^3$	$^3P - ^3S^o$	2 – 1	S3
	10	251.347	251.351	46 720+x	444 570+x	$2s^22p^2 - 2s2p^3$	$^1D - ^1P^o$	2 – 1	S3
			253.0	1 710	397 020+x	$2s^22p^2 - 2s2p^3$	$^3P - ^1D^o$	1 – 2	
			254.7	4 420	397 020+x	$2s^22p^2 - 2s2p^3$	$^3P - ^1D^o$	2 – 2	
			259.6	262 180	647 310+x	$2s2p^3 - 2p^4$	$^3D^o - ^1D$	3 – 2	
	50	285.467	285.470	46 720+x	397 020+x	$2s^22p^2 - 2s2p^3$	$^1D - ^1D^o$	2 – 2	S3
			285.56	262 330	612 510	$2s2p^3 - 2p^4$	$^3D^o - ^3P$	1 – 0	
		286.61	286.61	262 270	611 180	$2s2p^3 - 2p^4$	$^3D^o - ^3P$	2 – 1	K4
			286.66	262 330	611 180	$2s2p^3 - 2p^4$	$^3D^o - ^3P$	1 – 1	
	165	287.083	287.10	96 260+x	444 570+x	$2s^22p^2 - 2s2p^3$	$^1S - ^1P^o$	0 – 1	V1
		289.07	289.08	262 180	608 100	$2s2p^3 - 2p^4$	$^3D^o - ^3P$	3 – 2	K4
			289.16	262 270	608 100	$2s2p^3 - 2p^4$	$^3D^o - ^3P$	2 – 2	
			289.21	262 330	608 100	$2s2p^3 - 2p^4$	$^3D^o - ^3P$	1 – 2	
			299.2	404 200	738 460+x	$2s2p^3 - 2p^4$	$^3S^o - ^1S$	1 – 0	
	g	323.52	323.51	0	309 110	$2s^22p^2 - 2s2p^3$	$^3P - ^3P^o$	0 – 1	K4
	g	325.31	325.31	1 710	309 110	$2s^22p^2 - 2s2p^3$	$^3P - ^3P^o$	1 –	K4
	10g	328.200	328.20	4 420	309 110	$2s^22p^2 - 2s2p^3$	$^3P - ^3P^o$	2 –	S3
	40	329.551	329.60	309 110	612 510	$2s2p^3 - 2p^4$	$^3P^o - ^3P$	1 – 0	V1
	50	331.03	331.05	309 110	611 180	$2s2p^3 - 2p^4$	$^3P^o - ^3P$	– 1	F4
		334.51	334.46	309 110	608 100	$2s2p^3 - 2p^4$	$^3P^o - ^3P$	– 2	F4
		340.23	340.23	444 570+x	738 490+x	$2s2p^3 - 2p^4$	$^1P^o - ^1S$	1 – 0	F3
	g	381.15	381.20	0	262 330	$2s^22p^2 - 2s2p^3$	$^3P - ^3D^o$	0 – 1	F4
	g	383.70	383.70	1 710	262 330	$2s^22p^2 - 2s2p^3$	$^3P - ^3D^o$	1 – 1	K4
	50g	383.785	383.79	1 710	262 270	$2s^22p^2 - 2s2p^3$	$^3P - ^3D^o$	1 – 2	S3
			387.73	4 420	262 330	$2s^22p^2 - 2s2p^3$	$^3P - ^3D^o$	2 – 1	
			387.82	4 420	262 270	$2s^22p^2 - 2s2p^3$	$^3P - ^3D^o$	2 – 2	
	100g	387.970	387.96	4 420	262 180	$2s^22p^2 - 2s2p^3$	$^3P - ^3D^o$	2 – 3	S3
		399.57	399.54	397 020+x	647 310+x	$2s2p^3 - 2p^4$	$^1D^o - ^1D$	2 – 2	F3
		480.11	480.05	404 200	612 510	$2s2p^3 - 2p^4$	$^3S^o - ^3P$	1 – 0	F4
		483.03	483.14	404 200	611 180	$2s2p^3 - 2p^4$	$^3S^o - ^3P$	1 – 1	F4
		490.44	490.44	404 200	608 100	$2s2p^3 - 2p^4$	$^3S^o - ^3P$	1 – 2	F4

Al VIII – Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	R
		493.18	493.24	444 570+x	–	647 310+x	$2s2p^3-2p^4$	$^1P^o-{}^1D$	1–2	
	g	756.8	756.8	1 710	–	133 840	$2s^22p^2-2s2p^3$	$^3P-{}^5S^o$	1–2	
	g	772.7	772.7	4 420	–	133 840	$2s^22p^2-2s2p^3$	$^3P-{}^5S^o$	2–2	
	M1		1057.6	1 710	–	96 260+x	$2s^22p^2-2s^22p^2$	$^3P-{}^1S$	1–0	
		Air Wavelength (Å)								
	M1		2221	1 710	–	46 720+x	$2s^22p^2-2s^22p^2$	$^3P-{}^1D$	1–2	
	M1		2363	4 420	–	46 720+x	$2s^22p^2-2s^22p^2$	$^3P-{}^1D$	2–2	
		Wavenumber (cm^{-1})								
	M1	2687	2710	1 710	–	4 420	$2s^22p^2-2s^22p^2$	$^3P-{}^3P$	1–2	
	M1		1710	0	–	1 710	$2s^22p^2-2s^22p^2$	$^3P-{}^3P$	0–1	

Al IX

B I isoelectronic sequence

Ground state $1s^22s^22p\ ^2P^o_{1/2}$

Ionization energy 2 662 650 ± 600 cm^{-1} (330.13 ± 0.07eV)

Denne and Hinnov established the quartet-doublet intersystem connection within about ±30 cm^{-1} by classifying two lines near 960 Å as $2s^22p\ ^2P^o-2s2p^2\ ^4P$ transitions [D1]. We have reevaluated the quartet levels based on their results.

We obtained the ionization energy by fitting a linear Ritz formula to the $2s^2nd\ ^2D$ series ($n = 3-6$). The above value agrees with the value 2 662 500 ± 300 cm^{-1} derived from this same series by [H1], but our treatment of the data gives a larger standard-deviation error. Our value also agrees satisfactorily with the value 2 662 990 cm^{-1} which we obtained by applying a semi-empirical isoelectronic correction formula to a theoretically calculated value.

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Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	20g	41.543	41.543	4 890	2 412 030	$2s^22p-2s^26d$	$^2P^o-^2D$	3/2 – 5/2	H1
	10g	43.549	43.549	4 890	2 301 150	$2s^22p-2s^25d$	$^2P^o-^2D$	3/2 – 5/2	F2
	60g	44.704	44.704?	0	2 236 940?	$2s^22p-2s2p(^3P^o)4p$	$^2P^o-^2D$	1/2 – 3/2	H1
	80g	44.743	44.743?	4 890	2 239 880?	$2s^22p-2s2p(^3P^o)4p$	$^2P^o-^2D$	3/2 – 5/2	H1
	10g	47.755	47.755	0	2 094 020	$2s^22p-2s^24d$	$^2P^o-^2D$	1/2 – 3/2	F2
	50g	47.856	47.856	4 890	2 094 490	$2s^22p-2s^24d$	$^2P^o-^2D$	3/2 – 5/2	F2
	100	49.854	49.854?	259 730	2 265 590?	$2s2p^2-2s2p(^3P^o)4d$	$^2D-^2F^o$	5/2 – 7/2	F2
	100	49.916	49.929?	259 760	2 262 600?	$2s2p^2-2s2p(^3P^o)4d$	$^2D-^2F^o$	3/2 – 5/2	H1
	10g	52.966	52.963?	0	1 888 100?	$2s^22p-2s2p(^1P^o)3p$	$^2P^o-^2S$	1/2 – 1/2	H1
	10g	53.098	53.101?	4 890	1 888 100?	$2s^22p-2s2p(^1P^o)3p$	$^2P^o-^2S$	3/2 – 1/2	H1
	60g	53.237	53.237	0	1 878 400	$2s^22p-2s2p(^1P^o)3p$	$^2P^o-^2P$	1/2 – 3/2	H1
	60g	53.267	53.267	0	1 877 340	$2s^22p-2s2p(^1P^o)3p$	$^2P^o-^2P$	1/2 – 1/2	H1
	10g	53.376	53.376	4 890	1 878 400	$2s^22p-2s2p(^1P^o)3p$	$^2P^o-^2P$	3/2 – 3/2	F2
	10g	53.412	53.406	4 890	1 877 340	$2s^22p-2s2p(^1P^o)3p$	$^2P^o-^2P$	3/2 – 1/2	F2
	10	53.424	53.437	145 270	2 016 650	$2s2p^2-2p^23p$	$^4P-$	1/2 – 3/2	F2
	1	53.488	53.486	146 990	2 016 650	$2s2p^2-2p^23p$	$^4P-$	3/2 –	F2
	10	53.554	53.556	149 460	2 016 650	$2s2p^2-2p^23p$	$^4P-$	5/2 –	F2
	1	55.622	55.607	145 270	1 943 600	$2s2p^2-2s2p(^1P^o)3d$	$^4P-^2D^o$	1/2 – 3/2	F2
	10	55.667	55.660	146 990	1 943 600	$2s2p^2-2s2p(^1P^o)3d$	$^4P-^2D^o$	3/2 –	F2
	50g	56.151	56.149	0	1 780 960	$2s^22p-2s2p(^3P^o)3p$	$^2P^o-^2S$	1/2 – 1/2	F2
	70g	56.304	56.304	4 890	1 780 960	$2s^22p-2s2p(^3P^o)3p$	$^2P^o-^2S$	3/2 – 1/2	F2
	100g	56.899	56.899	0	1 757 500	$2s^22p-2s2p(^3P^o)3p$	$^2P^o-^2D$	1/2 – 3/2	F2
	250g	56.945	56.945	4 890	1 760 970	$2s^22p-2s2p(^3P^o)3p$	$^2P^o-^2D$	3/2 – 5/2	F2
	10g	58.060	58.058	0	1 722 410	$2s^22p-2s2p(^3P^o)3p$	$^2P^o-^2P$	1/2 – 3/2	F2
	50g	58.112	58.111	0	1 720 830	$2s^22p-2s2p(^3P^o)3p$	$^2P^o-^2P$	1/2 – 1/2	F2
	100g	58.222	58.223	4 890	1 722 410	$2s^22p-2s2p(^3P^o)3p$	$^2P^o-^2P$	3/2 – 3/2	F2
	1g	58.276	58.277	4 890	1 720 830	$2s^22p-2s2p(^3P^o)3p$	$^2P^o-^2P$	3/2 – 1/2	F2
	10	59.381	{ 59.387	259 730	1 943 600	$2s2p^2-2s2p(^1P^o)3d$	$^2D-^2D^o$	5/2 – 5/2	F2
			{ 59.388	259 760	1 943 600	$2s2p^2-2s2p(^1P^o)3d$	$^2D-^2D^o$	3/2 – 3/2	
	300	59.761	{ 59.762?	259 730	1 933 040?	$2s2p^2-2s2p(^1P^o)3d$	$^2D-^2F^o$	5/2 – 7/2	F2
			{ 59.763?	259 760	1 933 040?	$2s2p^2-2s2p(^1P^o)3d$	$^2D-^2F^o$	3/2 – 5/2	

Al IX — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	10	60.162	60.160	145 270	1 807 500	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4P^o$	1/2 – 3/2	F2
	50	60.197	60.197?	146 990	1 808 200?	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4P^o$	3/2 – 1/2	F2
	10	60.222	60.222	146 990	1 807 500	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4P^o$	3/2 – 3/2	F2
	10	60.262	60.260	146 990	1 806 470	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4P^o$	3/2 – 5/2	F2
	50	60.312	60.312	149 460	1 807 500	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4P^o$	5/2 – 3/2	F2
	100	60.347	60.350	149 460	1 806 470	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4P^o$	5/2 – 5/2	F2
	150	60.504	60.504	145 270	1 798 050	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4D^o$	1/2 –	F2
	200	60.549	{ 60.541?	585 180	2 236 940?	$2p^3 - 2s2p(^3P^o)4p$	$^2P^o - ^2D$	1/2 – 3/2	F2
			{ 60.551	146 990	1 798 480	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4D^o$	3/2 – 5/2	
	300	60.588	60.588	149 460	1 799 950	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4D^o$	5/2 – 7/2	F2
	10	60.645	60.642	149 460	1 798 480	$2s2p^2 - 2s2p(^3P^o)3d$	$^4P - ^4D^o$	5/2 – 5/2	F2
	300*g*	60.896	60.896	0	1 642 140	$2s^22p - 2s^23d$	$^2P^o - ^2D$	1/2 – 3/2	F2
	600*g*	61.069	61.069	4 890	1 642 380	$2s^22p - 2s^23d$	$^2P^o - ^2D$	3/2 – 5/2	F2
	10	61.647	61.651	332 710	1 954 750	$2s2p^2 - 2s2p(^1P^o)3d$	$^2S - ^2P^o$	1/2 –	F2
	50	62.070	62.077	332 710	1 943 600	$2s2p^2 - 2s2p(^1P^o)3d$	$^2S - ^2D^o$	1/2 – 3/2	F2
	200	62.296	62.296?	460 930	2 066 170?	$2p^3 - 2p^2(^3P)3d$	$^4S^o - ^4P$	3/2 – 1/2	F2
	250	62.327	62.327?	460 930	2 065 370?	$2p^3 - 2p^2(^3P)3d$	$^4S^o - ^4P$	3/2 – 3/2	F2
	150	62.369	62.369?	460 930	2 064 290?	$2p^3 - 2p^2(^3P)3d$	$^4S^o - ^4P$	3/2 – 5/2	F2
	100	62.474	62.474	354 080	1 954 750	$2s2p^2 - 2s2p(^1P^o)3d$	$^2P - ^2P^o$	1/2 –	F2
	100	62.587	62.586	356 950	1 954 750	$2s2p^2 - 2s2p(^1P^o)3d$	$^2P - ^2P^o$	3/2 –	F2
	150	62.916	62.912	354 080	1 943 600	$2s2p^2 - 2s2p(^1P^o)3d$	$^2P - ^2D^o$	1/2 – 3/2	F2
	500	63.025	63.026	356 950	1 943 600	$2s2p^2 - 2s2p(^1P^o)3d$	$^2P - ^2D^o$	3/2 – 5/2	F2
	500	63.509	63.509	259 730	1 834 310	$2s2p^2 - 2s2p(^3P^o)3d$	$^2D - ^2F^o$	5/2 – 7/2	F2
	300	63.632	63.632	259 760	1 831 300	$2s2p^2 - 2s2p(^3P^o)3d$	$^2D - ^2F^o$	3/2 – 5/2	F2
	50	64.625	{ 64.627	259 730	1 807 080	$2s2p^2 - 2s2p(^1P^o)3s$	$^2D - ^2P^o$	5/2 – 3/2	F2
			{ 64.628	259 760	1 807 080	$2s2p^2 - 2s2p(^1P^o)3s$	$^2D - ^2P^o$	3/2 – 1/2	
	150	64.885	64.885	259 730	1 800 910	$2s2p^2 - 2s2p(^3P^o)3d$	$^2D - ^2D^o$	5/2 – 5/2	F2
	100	64.904	64.903	259 760	1 800 510	$2s2p^2 - 2s2p(^3P^o)3d$	$^2D - ^2D^o$	3/2 – 3/2	F2
	50	66.038	66.036	146 990	1 661 320	$2s2p^2 - 2s2p(^3P^o)3s$	$^4P - ^4P^o$	3/2 – 5/2	F2
	50	66.092	66.092	145 270	1 658 320	$2s2p^2 - 2s2p(^3P^o)3s$	$^4P - ^4P^o$	1/2 – 3/2	F2
	120	66.142	66.144	149 460	1 661 320	$2s2p^2 - 2s2p(^3P^o)3s$	$^4P - ^4P^o$	5/2 – 5/2	F2
	150*bl*	66.239	{ 66.239?	146 990	1 656 680?	$2s2p^2 - 2s2p(^3P^o)3s$	$^4P - ^4P^o$	3/2 – 1/2	F2
			{ 66.239	332 710	1 842 400	$2s2p^2 - 2s2p(^3P^o)3d$	$^2S - ^2P^o$	1/2 – 1/2	
	50	66.275	{ 66.271	585 540	2 094 490	$2p^3 - 2s^24d$	$^2P^o - ^2D$	3/2 – 5/2	F2
			{ 66.275	149 460	1 658 320	$2s2p^2 - 2s2p(^3P^o)3s$	$^4P - ^4P^o$	5/2 – 3/2	
			{ 66.276	585 180	2 094 020	$2p^3 - 2s^24d$	$^2P^o - ^2D$	1/2 – 3/2	
	60	66.321	66.321	332 710	1 840 530	$2s2p^2 - 2s2p(^3P^o)3d$	$^2S - ^2P^o$	1/2 – 3/2	F2
	10*g*	66.624	66.621	0	1 501 020	$2s^22p - 2s^23s$	$^2P^o - ^2S$	1/2 – 1/2	F2
	100*g*	66.836	66.839	4 890	1 501 020	$2s^22p - 2s^23s$	$^2P^o - ^2S$	3/2 – 1/2	F2
	10	67.828	{ 67.826	356 950	1 831 300	$2s2p^2 - 2s2p(^3P^o)3d$	$^2P - ^2F^o$	3/2 – 5/2	F2
			{ 67.826	332 710	1 807 080	$2s2p^2 - 2s2p(^1P^o)3s$	$^2S - ^2P^o$	1/2 –	
	100	68.531	68.531	460 930	1 920 120	$2p^3 - 2p^2(^3P)3s$	$^4S^o - ^4P$	3/2 – 5/2	F2
	50	68.637	68.637	460 930	1 917 870	$2p^3 - 2p^2(^3P)3s$	$^4S^o - ^4P$	3/2 – 3/2	F2
	10	68.681	68.681	460 930	1 916 940	$2p^3 - 2p^2(^3P)3s$	$^4S^o - ^4P$	3/2 – 1/2	F2
	10	68.783	68.770?	354 080	1 808 200?	$2s2p^2 - 2s2p(^3P^o)3d$	$^2P - ^4P^o$	1/2 – 1/2	F2
	50	68.825	68.823	354 080	1 807 080	$2s2p^2 - 2s2p(^1P^o)3s$	$^2P - ^2P^o$	1/2 –	F2
	10	68.904	68.906?	356 950	1 808 200?	$2s2p^2 - 2s2p(^3P^o)3d$	$^2P - ^4P^o$	3/2 – 1/2	F2
	50	68.958	68.959	356 950	1 807 080	$2s2p^2 - 2s2p(^1P^o)3s$	$^2P - ^2P^o$	3/2 –	F2
	215	69.135	69.136	354 080	1 800 510	$2s2p^2 - 2s2p(^3P^o)3d$	$^2P - ^2D^o$	1/2 – 3/2	V1
	50	69.258	69.254	356 950	1 800 910	$2s2p^2 - 2s2p(^3P^o)3d$	$^2P - ^2D^o$	3/2 – 5/2	F2
	100	69.716	69.716	259 730	1 694 130	$2s2p^2 - 2s2p(^3P^o)3s$	$^2D - ^2P^o$	5/2 – 3/2	F2

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm⁻¹) Lower	Upper	Configurations	Terms	J Values	Ref.
	50	69.850	69.872?	259 760 –	1 690 940?	$2s2p^2-2s2p(^3P^o)3s$	$^2D-^2P^o$	3/2 – 1/2	F2
	100	70.090	70.069?	460 930 –	1 888 100?	$2p^3-2s2p(^1P^o)3p$	$^4S^o-^2S$	3/2 – 1/2	F2
	1	73.451	73.453	332 710 –	1 694 130	$2s2p^2-2s2p(^3P^o)3s$	$^2S-^2P^o$	1/2 – 3/2	F2
	1	73.625	{73.620	520 080 –	1 878 400	$2p^3-2s2p(^1P^o)3p$	$^2D^o-^2P$	5/2 – 3/2	F2
			{73.625?	332 710 –	1 690 940?	$2s2p^2-2s2p(^3P^o)3s$	$^2S-^2P^o$	1/2 – 1/2	
	50	74.785	74.784	356 950 –	1 694 130	$2s2p^2-2s2p(^3P^o)3s$	$^2P-^2P^o$	3/2 – 3/2	F2
	10	77.315	77.326	585 180 –	1 878 400	$2p^3-2s2p(^1P^o)3p$	$^2P^o-^2P$	1/2 – 3/2	F2
	150	77.381	77.390	585 180 –	1 877 340	$2p^3-2s2p(^1P^o)3p$	$^2P^o-^2P$	1/2 – 1/2	F2
	175*g*	280.114	280.151	0 –	356 950	$2s^22p-2s2p^2$	$^2P^o-^2P$	1/2 – 3/2	V1
	240*g*	282.407	282.422	0 –	354 080	$2s^22p-2s2p^2$	$^2P^o-^2P$	1/2 – 1/2	V1
	345*g*	284.015	284.042	4 890 –	356 950	$2s^22p-2s2p^2$	$^2P^o-^2P$	3/2 – 3/2	V1
	215*g*	286.364	286.377	4 890 –	354 080	$2s^22p-2s2p^2$	$^2P^o-^2P$	3/2 – 1/2	V1
	125*g*	300.560	300.562	0 –	332 710	$2s^22p-2s2p^2$	$^2P^o-^2S$	1/2 – 1/2	V1
	165*g*	305.055	305.045	4 890 –	332 710	$2s^22p-2s2p^2$	$^2P^o-^2S$	3/2 – 1/2	V1
		306.91	306.93	259 730 –	585 540	$2s2p^2-2p^3$	$^2D-^2P^o$	5/2 – 3/2	K5
		307.33	307.30	259 760 –	585 180	$2s2p^2-2p^3$	$^2D-^2P^o$	3/2 – 1/2	F4
	90	316.793	316.797	145 270 –	460 930	$2s2p^2-2p^3$	$^4P-^4S^o$	1/2 – 3/2	V1
	120	318.537	318.532	146 990 –	460 930	$2s2p^2-2p^3$	$^4P-^4S^o$	3/2 – 3/2	V1
	160	321.027	321.058	149 460 –	460 930	$2s2p^2-2p^3$	$^4P-^4S^o$	5/2 – 3/2	V1
		384.06	{384.05	259 760 –	520 140	$2s2p^2-2p^3$	$^2D-^2D^o$	3/2 – 3/2	F4
			{384.10	259 730 –	520 080	$2s2p^2-2p^3$	$^2D-^2D^o$	5/2 – 5/2	
	g	384.95	384.97	0 –	259 760	$2s^22p-2s2p^2$	$^2P^o-^2D$	1/2 – 3/2	K5
	80*g*	392.418	392.403	4 890 –	259 730	$2s^22p-2s2p^2$	$^2P^o-^2D$	3/2 – 5/2	F4
		395.44	395.52	332 710 –	585 540	$2s2p^2-2p^3$	$^2S-^2P^o$	1/2 – 3/2	F4
		396.05	396.09	332 710 –	585 180	$2s2p^2-2p^3$	$^2S-^2P^o$	1/2 – 1/2	F4
		432.03	432.04	354 080 –	585 540	$2s2p^2-2p^3$	$^2P-^2P^o$	1/2 – 3/2	K5
		432.73	432.71	354 080 –	585 180	$2s2p^2-2p^3$	$^2P-^2P^o$	1/2 – 1/2	F4
		437.46	437.46	356 950 –	585 540	$2s2p^2-2p^3$	$^2P-^2P^o$	3/2 – 3/2	K5
		438.18	438.15	356 950 –	585 180	$2s2p^2-2p^3$	$^2P-^2P^o$	3/2 – 1/2	F4
		533.50	533.53	332 710 –	520 140	$2s2p^2-2p^3$	$^2S-^2D^o$	1/2 – 3/2	T1
		602.18	602.19	354 080 –	520 140	$2s2p^2-2p^3$	$^2P-^2D^o$	1/2 – 3/2	F4
		613.10	613.09	356 950 –	520 080	$2s2p^2-2p^3$	$^2P-^2D^o$	3/2 – 5/2	F4
	g		680.3	0 –	146 990	$2s^22p-2s2p^2$	$^2P^o-^4P$	1/2 – 3/2	
	g	688.4	688.37	0 –	145 270	$2s^22p-2s2p^2$	$^2P^o-^4P$	1/2 – 1/2	D1
	g	691.7	691.71	4 890 –	149 460	$2s^22p-2s2p^2$	$^2P^o-^4P$	3/2 – 5/2	D1
	g		703.7	4 890 –	146 990	$2s^22p-2s2p^2$	$^2P^o-^4P$	3/2 – 3/2	
	g		712.4	4 890 –	145 270	$2s^22p-2s2p^2$	$^2P^o-^4P$	3/2 – 1/2	
		Wavenumber (cm⁻¹)							
	M1	4902	4890	0 –	4 890	$2s^22p-2s^22p$	$^2P^o-^2P^o$	1/2 – 3/2	G2

Al X

Be I isoelectronic sequence

Ground state $1s^2 2s^2\ ^1S_0$

Ionization energy 3 216 100 cm^{-1} (398.75 eV)

A measurement of the $2s^2\ ^1S_0 - 2s2p\ ^3P_1^\circ$ line at 637.85 Å [D1] gives a value of $x = -21 \pm 30$ cm^{-1} for the correction to the triplet level values in MZ79. We have here taken the triplet levels from MZ79 with $x = 0$, which is within the uncertainty of the quoted determination. Several lines in the region below 65 Å are given tentatively as Al X singlet-triplet intercombination transitions. Reevaluations of the data have led to small changes in $2s3d\ ^3D$ and $2s4f\ ^3F^\circ$ levels.

The two features near 7.9 Å were observed by Boiko *et al.* in the spectra of laser-produced plasmas [B5]. These features arise from K-shell excitation, each being classified as a blend of several transitions. The calculated wavelengths were obtained with upper levels based on the theoretical wavelengths from [B5].

We derived a value of 3 215 920 cm^{-1} for the ionization energy by applying a semi-empirical isoelectronic correction formula to a theoretically calculated value. Edlén's [1971] ionization-energy formula for this sequence gives a value of 3 216 300 cm^{-1}. The value given above is based on these results.

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Al x

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	90*bl*	7.934	7.9130	449 732 –	[13 087 200]	$1s^22p^2-1s2p^3$	$^1D-^1P^o$	2 – 1	B5
			7.9240	0 –	[12 619 900]	$1s^22s^2-1s2s^22p$	$^1S-^1P^o$	0 – 1	
			7.9294	409 690 –	[13 021 000]	$1s^22p^2-1s2p^3$	$^3P-^3P^o$	2 – 2	
			7.9332	300 490 –	[12 905 700]	$1s^22s2p-1s(^2S)2s2p^2(^2P)$	$^1P^o-^1P$	1 – 1	
			7.9462	156 798 –	[12 741 400]	$1s^22s2p-1s(^2S)2s2p^2(^4P)$	$^3P^o-^3P$	1 – 1	
			7.9464	160 429 –	[12 744 700]	$1s^22s2p-1s(^2S)2s2p^2(^4P)$	$^3P^o-^3P$	2 – 2	
	150*bl*	7.951	7.9475	155 148 –	[12 737 700]	$1s^22s2p-1s(^2S)2s2p^2(^2D)$	$^3P^o-^3D$	0 – 1	B5
			7.9476	156 798 –	[12 739 200]	$1s^22s2p-1s(^2S)2s2p^2(^4P)$	$^3P^o-^3P$	1 – 0	
			7.9485	160 429 –	[12 741 400]	$1s^22s2p-1s(^2S)2s2p^2(^4P)$	$^3P^o-^3P$	2 – 1	
			7.9489	156 798 –	[12 737 200]	$1s^22s2p-1s(^2S)2s2p^2(^2D)$	$^3P^o-^3D$	1 – 2	
			7.9516	160 429 –	[12 736 500]	$1s^22s2p-1s(^2S)2s2p^2(^2D)$	$^3P^o-^3D$	2 – 3	
			7.9621	449 732 –	[13 009 200]	$1s^22p^2-1s2p^3$	$^1D-^1D^o$	2 – 2	
			7.9749	300 490 –	[12 839 800]	$1s^22s2p-1s(^2S)2s2p^2(^2D)$	$^1P^o-^1D$	1 – 2	
			7.9749	404 574 –	[12 943 900]	$1s^22p^2-1s2p^3$	$^3P-^3D^o$	0 – 1	
			7.9762	406 517 –	[12 943 800]	$1s^22p^2-1s2p^3$	$^3P-^3D^o$	1 – 2	
			7.9787	553 783 –	[13 087 200]	$1s^22p^2-1s2p^3$	$^1S-^1P^o$	0 – 1	
			7.9791	409 690 –	[12 942 400]	$1s^22p^2-1s2p^3$	$^3P-^3D^o$	2 – 3	
	100	38.255	38.255?	160 429 –	2 774 450?	$2s2p-2s5d$	$^3P^o-^1D$	2 – 2	H2
	25	40.421	40.421?	300 490 –	2 774 450?	$2s2p-2s5d$	$^1P^o-^1D$	1 – 2	H2
	100	41.730	41.730?	300 490 –	2 696 850?	$2s2p-2p4p$	$^1P^o-^1D$	1 – 2	H2
	10	44.902	44.902?	300 490 –	2 527 560?	$2s2p-2s4d$	$^1P^o-^1D$	1 – 2	F2
	50	50.670	50.669	156 798 –	2 130 410	$2s2p-2p3p$	$^3P^o-^3P$	1 – 2	F2
	75	50.717	50.713	156 798 –	2 128 680	$2s2p-2p3p$	$^3P^o-^3P$	1 – 1	H2
	350	50.762	50.762	160 429 –	2 130 410	$2s2p-2p3p$	$^3P^o-^3P$	2 – 2	H2
	50	50.802	50.807	160 429 –	2 128 680	$2s2p-2p3p$	$^3P^o-^3P$	2 – 1	F2
	50	50.903	50.902	155 148 –	2 119 690	$2s2p-2p3p$	$^3P^o-^3S$	0 – 1	H2
	10	50.946	50.945	156 798 –	2 119 690	$2s2p-2p3p$	$^3P^o-^3S$	1 – 1	F2
	10	51.039	51.040	160 429 –	2 119 690	$2s2p-2p3p$	$^3P^o-^3S$	2 – 1	F2
	350	51.362	51.356	155 148 –	2 102 330	$2s2p-2p3p$	$^3P^o-^3D$	0 – 1	F2
			51.358	156 798 –	2 103 900	$2s2p-2p3p$	$^3P^o-^3D$	1 – 2	
			51.362	160 429 –	2 107 390	$2s2p-2p3p$	$^3P^o-^3D$	2 – 3	
	1	51.400	51.400	156 798 –	2 102 330	$2s2p-2p3p$	$^3P^o-^3D$	1 – 1	F2
	1	51.454	51.454	160 429 –	2 103 900	$2s2p-2p3p$	$^3P^o-^3D$	2 – 2	F2
	300*g*	51.979	51.979	0 –	1 923 850	$2s^2-2s3p$	$^1S-^1P^o$	0 – 1	F2
	220	54.115	54.115	300 490 –	2 148 410	$2s2p-2p3p$	$^1P^o-^1D$	1 – 2	F2
	150	55.227	55.227	155 148 –	1 965 860	$2s2p-2s3d$	$^3P^o-^3D$	0 – 1	F2
	500	55.272	55.271	156 798 –	1 966 080	$2s2p-2s3d$	$^3P^o-^3D$	1 – 2	F2
	750	55.376	55.375	160 421 –	1 966 300	$2s2p-2s3d$	$^3P^o-^3D$	2 – 3	F2
	50	55.731	55.731	300 490 –	2 094 820	$2s2p-2p3p$	$^1P^o-^1P$	1 – 1	F2
	75	56.590	56.590	404 574 –	2 171 680	$2p^2-2p3d$	$^3P-^3P^o$	0 – 1	H2
	10	56.650	56.652	406 517 –	2 171 680	$2p^2-2p3d$	$^3P-^3P^o$	1 – 1	F2
	75	56.696	56.700	406 517 –	2 170 190	$2p^2-2p3d$	$^3P-^3P^o$	1 – 2	H2
	10	56.762	56.754	409 690 –	2 171 680	$2p^2-2p3d$	$^3P-^3P^o$	2 – 1	F2
	200	56.802	56.802	409 690 –	2 170 190	$2p^2-2p3d$	$^3P-^3P^o$	2 – 2	F2
	250	56.945	56.945?	404 574 –	2 160 650?	$2p^2-2p3d$	$^3P-^3D^o$	0 – 1	H2
	150	56.964	56.966	406 517 –	2 161 960	$2p^2-2p3d$	$^3P-^3D^o$	1 – 2	F2
	250	57.024	57.024	409 690 –	2 163 340	$2p^2-2p3d$	$^3P-^3D^o$	2 – 3	F2
	10	57.072	57.069	409 690 –	2 161 960	$2p^2-2p3d$	$^3P-^3D^o$	2 – 2	F2
	75	57.116	57.112?	409 690 –	2 160 650?	$2p^2-2p3d$	$^3P-^3D^o$	2 – 1	H2
	350	57.368	57.368	449 732 –	2 192 860	$2p^2-2p3d$	$^1D-^1F^o$	2 – 3	F2
	10	57.663	57.635?	406 517 –	2 141 580?	$2p^2-2p3d$	$^3P-^1D^o$	1 – 2	F2
	1	58.808	58.802	155 148 –	1 855 760	$2s2p-2s3s$	$^3P^o-^3S$	0 – 1	F2

Al x — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	100	58.858	58.859	156 798	1 855 760	$2s2p-2s3s$	$^3P^o-^3S$	1–1	F2
	150	58.987	58.986	160 429	1 855 760	$2s2p-2s3s$	$^3P^o-^3S$	2–1	F2
	300	59.107	59.107?	300 490	1 992 340?	$2s2p-2s3d$	$^1P^o-^1D$	1–2	F2
			59.107?	449 732	2 141 580?	$2p^2-2p3d$	$^1D-^1D^o$	2–2	
	10	59.298	59.266?	404 574	2 091 870?	$2p^2-2p3s$	$^3P-^1P^o$	0–1	F2
			59.335?	406 517	2 091 870?	$2p^2-2p3s$	$^3P-^1P^o$	1–1	
	50	60.052	60.039?	300 490	1 966 080?	$2s2p-2s3d$	$^1P^o-^3D$	1–2	F2
	205	60.632	60.583?	406 517	2 057 140?	$2p^2-2p3s$	$^3P-^3P^o$	1–2	V1
	10	60.700	60.700?	409 690	2 057 140?	$2p^2-2p3s$	$^3P-^3P^o$	2–2	F2
	185	60.896	60.896?	449 732	2 091 870?	$2p^2-2p3s$	$^1D-^1P^o$	2–1	F2
	200	63.134	63.134	300 490	1 884 420	$2s2p-2s3s$	$^1P^o-^1S$	1–0	F2
	10	64.269	64.298?	300 490	1 855 760?	$2s2p-2s3s$	$^1P^o-^3S$	1–1	F2
	175	65.032	65.016?	553 783	2 091 870?	$2p^2-2p3s$	$^1S-^1P^o$	0–1	V1
	50	65.821	65.821	404 574	1 923 850	$2p^2-2s3p$	$^3P-^1P^o$	0–1	F2
		177.80	177.77	1 966 030	2 528 570	$2s3d-2s4f$	$^3D-^3F^o$	2–3	F3
			177.84	1 966 270	2 528 570	$2s3d-2s4f$	$^3D-^3F^o$	3–4	
	20*g*	332.78	332.79	0	300 490	$2s^2-2s2p$	$^1S-^1P^o$	0–1	K5
			341.37	156 798	449 732	$2s2p-2p^2$	$^3P^o-^1D$	1–2	
			345.66	160 429	449 732	$2s2p-2p^2$	$^3P^o-^1D$	2–2	
		394.83	394.80	300 490	553 783	$2s2p-2p^2$	$^1P^o-^1S$	1–0	F4
		395.44	395.43	156 798	409 690	$2s2p-2p^2$	$^3P^o-^3P$	1–2	F4
		397.85	397.82	155 148	406 517	$2s2p-2p^2$	$^3P^o-^3P$	0–1	F4
		400.46	400.45	156 798	406 517	$2s2p-2p^2$	$^3P^o-^3P$	1–1	F4
	10	401.183	401.186	160 429	409 690	$2s2p-2p^2$	$^3P^o-^3P$	2–2	S3
		403.60	403.59	156 798	404 574	$2s2p-2p^2$	$^3P^o-^3P$	1–0	F4
		406.39	406.36	160 429	406 517	$2s2p-2p^2$	$^3P^o-^3P$	2–1	F4
	g	637.85	637.76	0	156 798	$2s^2-2s2p$	$^1S-^3P^o$	0–1	D1
		670.06	670.05	300 490	449 732	$2s2p-2p^2$	$^1P^o-^1D$	1–2	F4
			670.06?	1 992 340	2 141 580?	$2s3d-2p3d$	$^1D-^1D^o$	2–2	

Al XI

Li I isoelectronic sequence

Ground state $1s^22s\ ^2S_{1/2}$

Ionization energy 3 564 960 ± 250 cm^{-1} (442.00 ± 0.03 eV)

We have reevaluated the $1s^24p$, $4d$, and $4f$ levels using wavelength determinations by Fawcett and Ridgeley [F9]. The $1s^24f\ ^2F^\circ$ levels are given in brackets because we fixed their fine-structure separation at the Z-scaled hydrogenic value. The ionization energy is based on the revised $1s^24f$ position and a theoretical $4f$ term value [MZ79]. The $1s^25d$ and $5f$ levels were evaluated using methods described by Edlén [1979] with the adopted ionization energy; the corresponding calculated wavelengths for the $3p-5d$ and $3d-5f$ lines are probably more accurate than the available measurements [J3].

Several features observed between 7.80 and 7.93 Å have been classified as transitions from upper levels of the K-shell excited configurations $1s2s^2$, $1s2s2p$, and $1s2p^2$ [F7, A4, M2]. Since most of these features are blends, we evaluated the upper levels using calculations by Vainshtein and Safronova [1975] and a correction for QED and some smaller contributions not included in their calculations. After reducing the $1s^22p-1s2s^2$, $1s^22s-1s2s2p$ and $1s^22p-1s2p^2$ separations of Vainshtein and Safronova by 1420 cm^{-1}, as an average correction, we derived the $1s2s^2$, $1s2s2p$, and $1s2p^2$ doublet levels by combining these adjusted separations with the $1s^22s$ and $1s^22p$ levels of MZ79. The $1s2s2p\ ^4P^\circ$ and $1s2p^2\ ^4P$ levels were determined in a similar manner, the level separations being further adjusted to give optimal agreement with measurements of the $1s2s2p\ ^4P^\circ - 1s2p^2\ ^4P$ lines (523 – 542 Å) [B7,T1].

We have also included features classified by transitions from still higher K-shell excited levels assigned to configurations of the type $1s2l3l'$ [A4, B6, F6]. The calculated values given for most of these levels were obtained from theoretical wavelengths [Vainshtein and Safronova, 1980] corrected to include Lamb shifts and adjusted to the values for the lower levels in MZ79.

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Al XI

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	3g	6.7435	6.7435	0	14 829 100	$1s^2(^1S)2s - 1s2s(^1S)3p$	$^2S - ^2P^\circ$	1/2 –	B6
	9	6.7775	6.7760	176 019	[14 934 000]	$1s^2(^1S)2p - 1s2p(^1P^\circ)3p$	$^2P^\circ - ^2P$	1/2 – 1/2	B6
			6.7762	176 019	[14 933 600]	$1s^2(^1S)2p - 1s2p(^1P^\circ)3p$	$^2P^\circ - ^2D$	1/2 – 3/2	
			6.7776	181 808	[14 936 400]	$1s^2(^1S)2p - 1s2p(^1P^\circ)3p$	$^2P^\circ - ^2P$	3/2 – 3/2	
			6.7788	181 808	[14 933 600]	$1s^2(^1S)2p - 1s2p(^1P^\circ)3p$	$^2P^\circ - ^2D$	3/2 –	
	13g	6.7921	6.7884	176 019	[14 907 000]	$1s^2(^1S)2p - 1s2p(^3P^\circ)3p$	$^2P^\circ - ^2S$	1/2 – 1/2	B6
			6.7911	181 808	[14 907 000]	$1s^2(^1S)2p - 1s2p(^3P^\circ)3p$	$^2P^\circ - ^2S$	3/2 – 1/2	
			6.7926	0	[14 721 800]	$1s^2(^1S)2s - 1s2s(^3S)3p$	$^2S - ^2P^\circ$	1/2 –	
	27	6.8045	6.8026	176 019	[14 876 300]	$1s^2(^1S)2p - 1s2p(^3P^\circ)3p$	$^2P^\circ - ^2D$	1/2 – 3/2	B6
			6.8027	176 019	[14 876 000]	$1s^2(^1S)2p - 1s2s(^1S)3d$	$^2P^\circ - ^2D$	1/2 – 3/2	
			6.8033	181 808	[14 880 600]	$1s^2(^1S)2p - 1s2p(^3P^\circ)3p$	$^2P^\circ - ^2D$	3/2 – 5/2	
			6.8054	181 808	[14 876 000]	$1s^2(^1S)2p - 1s2p(^1S)3d$	$^2P^\circ - ^2D$	3/2 –	

Al XI — Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm⁻¹) Lower	Upper	Configurations	Terms	J Values	Ref.
	5bl	6.8215	6.8238	176 019	[14 830 600]	$1s^2(^1S)2p - 1s2p(^3P^o)3p$	$^2P^o - ^2P$	1/2 – 1/2	B6
	3bl	6.8277	6.8265	181 808	[14 830 600]	$1s^2(^1S)2p - 1s2p(^3P^o)3p$	$^2P^o - ^2P$	3/2 – 3/2	B6
	3	6.8463	6.8445	176 019	14 786 300	$1s^2(^1S)2p - 1s2s(^3S)3d$	$^2P^o - ^2D$	1/2 – 3/2	B6
			6.8472	181 808	14 786 300	$1s^2(^1S)2p - 1s2s(^3S)3d$	$^2P^o - ^2D$	3/2 –	
	10	7.774	7.7715	2 020 450	[14 888 000]	$1s^2(^1S)3s - 1s2p(^1P^o)3s$	$^2S - ^2P^o$	1/2 – 1/2	A4,F6
			7.7722	2 020 450	[14 886 800]	$1s^2(^1S)3s - 1s2p(^1P^o)3s$	$^2S - ^2P^o$	1/2 – 3/2	
			7.7725	2 070 520	[14 936 400]	$1s^2(^1S)3p - 1s2p(^1P^o)3p$	$^2P^o - ^2P$	3/2 – 3/2	
			7.7729	2 068 770	[14 934 000]	$1s^2(^1S)3p - 1s2p(^1P^o)3p$	$^2P^o - ^2P$	1/2 – 1/2	
			7.7731	2 068 770	[14 933 600]	$1s^2(^1S)3p - 1s2p(^1P^o)3p$	$^2P^o - ^2D$	1/2 – 3/2	
			7.7742	2 070 520	[14 933 600]	$1s^2(^1S)3p - 1s2p(^1P^o)3p$	$^2P^o - ^2D$	3/2 –	
		7.7963	7.7961	176 019	[13 002 900]	$1s^2(^1S)2p - 1s2p^2$	$^2P^o - ^2S$	1/2 – 1/2	A4
			7.7996	181 808	[13 002 900]	$1s^2(^1S)2p - 1s2p^2$	$^2P^o - ^2S$	3/2 – 1/2	
		7.8069	7.8064	2 070 520	[14 880 600]	$1s^2(^1S)3p - 1s2p(^3P^o)3p$	$^2P^o - ^2D$	3/2 – 5/2	F7
			7.8079	2 068 770	[14 876 300]	$1s^2(^1S)3p - 1s2p(^3P^o)3p$	$^2P^o - ^2D$	1/2 – 3/2	
			7.8090	0	[12 805 800]	$1s^2(^1S)2s - 1s(^2S)2s2p(^1P^o)$	$^2S - ^2P^o$	1/2 – 3/2	
			7.8099	0	[12 804 300]	$1s^2(^1S)2s - 1s(^2S)2s2p(^1P^o)$	$^2S - ^2P^o$	1/2 – 1/2	
	g	7.8471	7.8470	0	[12 743 800]	$1s^2(^1S)2s - 1s(^2S)2s2p(^3P^o)$	$^2S - ^2P^o$	1/2 – 3/2	F7
			7.8489	0	[12 740 600]	$1s^2(^1S)2s - 1s(^2S)2s2p(^3P^o)$	$^2S - ^2P^o$	1/2 – 1/2	
		7.8571	7.8547	176 019	[12 907 200]	$1s^2(^1S)2p - 1s2p^2$	$^2P^o - ^2P$	1/2 – 3/2	F7
			7.8581	176 019	[12 901 700]	$1s^2(^1S)2p - 1s2p^2$	$^2P^o - ^2P$	1/2 – 1/2	
			7.8583	181 808	[12 907 200]	$1s^2(^1S)2p - 1s2p^2$	$^2P^o - ^2P$	3/2 – 3/2	
		7.8756	7.8718	176 019	[12 879 600]	$1s^2(^1S)2p - 1s2p^2$	$^2P^o - ^2D$	1/2 – 3/2	A4
			7.8754	181 808	[12 879 600]	$1s^2(^1S)2p - 1s2p^2$	$^2P^o - ^2D$	3/2 – 3/2	
			7.8761	181 808	[12 878 500]	$1s^2(^1S)2p - 1s2p^2$	$^2P^o - ^2D$	3/2 – 5/2	
	g	7.929	7.9298	0	[12 610 670]	$1s^2(^1S)2s - 1s(^2S)2s2p(^3P^o)$	$^2S - ^4P^o$	1/2 – 5/2	M2
	2g	29.416	29.416	0	3 399 500	$1s^2(^1S)2s - 1s^2(^1S)9p$	$^2S - ^2P^o$	1/2 –	F5
	3g	29.793	29.793	0	3 356 500	$1s^2(^1S)2s - 1s^2(^1S)8p$	$^2S - ^2P^o$	1/2 –	F5
	4g	30.376	30.376	0	3 292 100	$1s^2(^1S)2s - 1s^2(^1S)7p$	$^2S - ^2P^o$	1/2 –	F5
	5g	31.313	31.313	0	3 193 600	$1s^2(^1S)2s - 1s^2(^1S)6p$	$^2S - ^2P^o$	1/2 –	F5
	1	31.426	31.426	176 019	3 358 100	$1s^2(^1S)2p - 1s^2(^1S)8d$	$^2P^o - ^2D$	1/2 – 3/2	F5
	2	31.483	31.483	181 808	3 358 100	$1s^2(^1S)2p - 1s^2(^1S)8d$	$^2P^o - ^2D$	3/2 – 5/2	F5
	2	32.068	32.069	176 019	3 294 300	$1s^2(^1S)2p - 1s^2(^1S)7d$	$^2P^o - ^2D$	1/2 – 3/2	F5
	3	32.128	32.129	181 808	3 294 300	$1s^2(^1S)2p - 1s^2(^1S)7d$	$^2P^o - ^2D$	3/2 – 5/2	F5
	9g	33.007	33.007	0	3 029 700	$1s^2(^1S)2s - 1s^2(^1S)5p$	$^2S - ^2P^o$	1/2 –	F5
	3	33.109	33.108	176 019	3 196 400	$1s^2(^1S)2p - 1s^2(^1S)6d$	$^2P^o - ^2D$	1/2 – 3/2	F5
	5	33.172	33.172	181 808	3 196 400	$1s^2(^1S)2p - 1s^2(^1S)6d$	$^2P^o - ^2D$	3/2 – 5/2	F5
	9	34.994	34.998	176 019	3 033 360	$1s^2(^1S)2p - 1s^2(^1S)5d$	$^2P^o - ^2D$	1/2 – 3/2	F5
	10	35.065	35.067	181 808	3 033 470	$1s^2(^1S)2p - 1s^2(^1S)5d$	$^2P^o - ^2D$	3/2 – 5/2	F5
	2	35.163	35.166	176 019	3 019 700	$1s^2(^1S)2p - 1s^2(^1S)5s$	$^2P^o - ^2S$	1/2 – 1/2	F5
	2	35.239	35.237	181 808	3 019 700	$1s^2(^1S)2p - 1s^2(^1S)5s$	$^2P^o - ^2S$	3/2 – 1/2	F5
	12g	36.675	36.671	0	2 726 910	$1s^2(^1S)2s - 1s^2(^1S)4p$	$^2S - ^2P^o$	1/2 – 3/2	F5
			36.682	0	2 726 120	$1s^2(^1S)2s - 1s^2(^1S)4p$	$^2S - ^2P^o$	1/2 – 1/2	
	10	39.091	39.092	176 019	2 734 110	$1s^2(^1S)2p - 1s^2(^1S)4d$	$^2P^o - ^2D$	1/2 – 3/2	F5
	12	39.180	39.175	181 808	2 734 440	$1s^2(^1S)2p - 1s^2(^1S)4d$	$^2P^o - ^2D$	3/2 – 5/2	F2
	6	39.530	39.531	176 019	2 705 700	$1s^2(^1S)2p - 1s^2(^1S)4s$	$^2P^o - ^2S$	1/2 – 1/2	F5
	7	39.623	39.621	181 808	2 705 700	$1s^2(^1S)2p - 1s^2(^1S)4s$	$^2P^o - ^2S$	3/2 – 1/2	F5
	15g	48.297	48.297	0	2 070 520	$1s^2(^1S)2s - 1s^2(^1S)3p$	$^2S - ^2P^o$	1/2 – 3/2	F2
	15g	48.338	48.338	0	2 068 770	$1s^2(^1S)2s - 1s^2(^1S)3p$	$^2S - ^2P^o$	1/2 – 1/2	F2
	12	52.299	52.299	176 019	2 088 100	$1s^2(^1S)2p - 1s^2(^1S)3d$	$^2P^o - ^2D$	1/2 – 3/2	F2
	15	52.446	52.446	181 808	2 088 530	$1s^2(^1S)2p - 1s^2(^1S)3d$	$^2P^o - ^2D$	3/2 – 5/2	F2
	5	54.217	54.217	176 019	2 020 450	$1s^2(^1S)2p - 1s^2(^1S)3s$	$^2P^o - ^2S$	1/2 – 1/2	F2
	6	54.388	54.388	181 808	2 020 450	$1s^2(^1S)2p - 1s^2(^1S)3s$	$^2P^o - ^2S$	3/2 – 1/2	F2
		103.8	103.67	2 068 770	[3 033 360]	$1s^2(^1S)3p - 1s^2(^1S)5d$	$^2P^o - ^2D$	1/2 – 3/2	J3
			103.85	2 070 520	[3 033 470]	$1s^2(^1S)3p - 1s^2(^1S)5d$	$^2P^o - ^2D$	3/2 – 5/2	
		105.7	105.75	2 088 100	[3 033 700]	$1s^2(^1S)3d - 1s^2(^1S)5f$	$^2D - ^2F^o$	3/2 – 5/2	J3
			105.79	2 088 530	[3 033 760]	$1s^2(^1S)3d - 1s^2(^1S)5f$	$^2D - ^2F^o$	5/2 – 7/2	
		141.55	141.55	2 020 450	2 726 910	$1s^2(^1S)3s - 1s^2(^1S)4p$	$^2S - ^2P^o$	1/2 – 3/2	F9

Al XI – Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
		141.71	141.71	2 020 450	–	2 726 120	$1s^2(^1S)3s - 1s^2(^1S)4p$	$^2S - ^2P^o$	1/2 – 1/2	F9
		150.30	150.30	2 068 770	–	2 734 110	$1s^2(^1S)3p - 1s^2(^1S)4d$	$^2P^o - ^2D$	1/2 – 3/2	F9
		150.62	150.62	2 070 520	–	2 734 440	$1s^2(^1S)3p - 1s^2(^1S)4d$	$^2P^o - ^2D$	3/2 – 5/2	F9
		154.60	154.61	2 088 100	–	[2 734 870]	$1s^2(^1S)3d - 1s^2(^1S)4f$	$^2D - ^2F^o$	3/2 – 5/2	F9
		154.69	154.69	2 088 530	–	[2 734 980]	$1s^2(^1S)3d - 1s^2(^1S)4f$	$^2D - ^2F^o$	5/2 – 7/2	F9
		523.02	522.99	[12 606 780]	–	[12 797 990]	$1s(^2S)2s2p(^3P^o) - 1s2p^2$	$^4P^o - ^4P$	3/2 – 5/2	B7
		526.67	526.68	[12 605 220]	–	[12 795 090]	$1s(^2S)2s2p(^3P^o) - 1s2p^2$	$^4P^o - ^4P$	1/2 – 3/2	B7,T1
		531.03	531.04	[12 606 780]	–	[12 795 090]	$1s(^2S)2s2p(^3P^o) - 1s2p^2$	$^4P^o - ^4P$	3/2 – 3/2	B7,T1
	bl	533.7	533.85	[12 610 670]	–	[12 797 990]	$1s(^2S)2s2p(^3P^o) - 1s2p^2$	$^4P^o - ^4P$	5/2 – 5/2	T1
	bl	534.0	534.02	[12 605 220]	–	[12 792 480]	$1s(^2S)2s2p(^3P^o) - 1s2p^2$	$^4P^o - ^4P$	1/2 – 1/2	T1
		538.48	538.50	[12 606 780]	–	[12 792 480]	$1s(^2S)2s2p(^3P^o) - 1s2p^2$	$^4P^o - ^4P$	3/2 – 1/2	B7,T1
		542.25	542.24	[12 610 670]	–	[12 795 090]	$1s(^2S)2s2p(^3P^o) - 1s2p^2$	$^4P^o - ^4P$	5/2 – 3/2	B7,T1
	100*g*	550.03	550.03	0	–	181 808	$1s^2(^1S)2s - 1s^2(^1S)2p$	$^2S - ^2P^o$	1/2 – 3/2	F4,K5
	50*g*	568.12	568.12	0	–	176 019	$1s^2(^1S)2s - 1s^2(^1S)2p$	$^2S - ^2P^o$	1/2 – 1/2	F4

Al XII

He I isoelectronic sequence

Ground state $1s^2\ ^1S_0$

Ionization energy 16 824 529 ± 250 cm^{-1} (2085.98 ± 0.03 eV)

The ionization energy and the $1s2l$ levels are theoretical values from Drake [1988]. The other $1snl$ levels are also theoretical values, derived from calculated term values and Drake's ionization energy (see Martin *et al.* [1990] for sources of term values, etc.). The calculated wavelengths for the transitions from upper $1snl$ levels have estimated uncertainties from less than unity to at most a few units in the last decimal place; in most cases the calculated wavelengths are expected to be more accurate than the observed values.

The relative intensities for the $1s^2 - 1snp$ lines are meant only as a rough guide and do not correspond to any specific plasma conditions.

The values of the $2s^2$, $2s2p$, and $2p^2$ levels are based on theoretical calculations by Vainshtein and Safronova [1978], adjusted here to include QED contributions and also for consistency with the adopted $1s2l$ level values. Transitions of the type $1snl$ – $2l'nl''$ $(n \geqslant 2)$ from doubly-excited configurations in Al XII give rise to "satellite" features near the Al XIII $1s\ ^2S - 2p\ ^2P^\circ$ resonance doublet at 7.17 Å. The most prominent of these satellites are due to transitions with $n = 2$; we have included several such features, which lie on the long wavelength side of the Al XIII doublet. Satellite transitions involving configurations with $n \geqslant 3$ (omitted here) lie nearer the Al XIII doublet and may affect its structure and shape from both the long and short wavelength sides [B9].

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Al XII

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
	10g	5.9925	6.0000	0	–	[16 666 564]	$1s^2 - 1s10p$	$^1S - {}^1P^\circ$	0 – 1	A4
	15g	6.0100	6.0134	0	–	[16 629 519]	$1s^2 - 1s9p$	$^1S - {}^1P^\circ$	0 – 1	A4
	20g	6.0299	6.0322	0	–	[16 577 734]	$1s^2 - 1s8p$	$^1S - {}^1P^\circ$	0 – 1	A4
	25g	6.0595	6.0598	0	–	[16 502 210]	$1s^2 - 1s7p$	$^1S - {}^1P^\circ$	0 – 1	A4
	35g	6.1010	6.1028	0	–	[16 385 868]	$1s^2 - 1s6p$	$^1S - {}^1P^\circ$	0 – 1	A4
	50g	6.1750	6.1755	0	–	[16 192 975]	$1s^2 - 1s5p$	$^1S - {}^1P^\circ$	0 – 1	A4
	g		6.1773	0	–	[16 188 299]	$1s^2 - 1s5p$	$^1S - {}^3P^\circ$	0 – 1	
	100g	6.3142	6.3139	0	–	[15 838 068]	$1s^2 - 1s4p$	$^1S - {}^1P^\circ$	0 – 1	F7
	g		6.3176	0	–	[15 828 823]	$1s^2 - 1s4p$	$^1S - {}^3P^\circ$	0 – 1	
	400g	6.6351	6.6348	0	–	[15 072 141]	$1s^2 - 1s3p$	$^1S - {}^1P^\circ$	0 – 1	F7
	20g	6.6449	6.6447	0	–	[15 049 634]	$1s^2 - 1s3p$	$^1S - {}^3P^\circ$	0 – 1	B8
	13	7.1936	7.1929	[12 891 081]	–	[26 793 700]	$1s2p - 2p^2$	$^1P^\circ - {}^1S$	1 – 0	B9
	6	7.206	7.2319	[12 815 760]	–	[26 643 400]	$1s2s - 2s2p$	$^1S - {}^1P^\circ$	0 – 1	B9
	4	7.2501	7.2509	[12 703 061]	–	[26 494 500]	$1s2s - 2s2p$	$^3S - {}^3P^\circ$	1 – 2	B9
	3	7.2546	{ 7.2545	[12 703 061]	–	[26 487 600]	$1s2s - 2s2p$	$^3S - {}^3P^\circ$	1 – 1	B9
			{ 7.2560	[12 703 061]	–	[26 484 800]	$1s2s - 2s2p$	$^3S - {}^3P^\circ$	1 – 0	

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
	2	7.2596	7.2581	[12 809 088]	–	[26 586 800]	$1s2p-2p^2$	$^3P^o-^3P$	1 – 2	B9
			7.2605	[12 807 847]	–	[26 581 100]	$1s2p-2p^2$	$^3P^o-^3P$	0 – 1	
			7.2608	[12 814 213]	–	[26 586 800]	$1s2p-2p^2$	$^3P^o-^3P$	2 – 2	
			7.2611	[12 809 088]	–	[26 581 100]	$1s2p-2p^2$	$^3P^o-^3P$	1 – 1	
			7.2629	[12 809 088]	–	[26 577 700]	$1s2p-2p^2$	$^3P^o-^3P$	1 – 0	
			7.2638	[12 814 213]	–	[26 581 100]	$1s2p-2p^2$	$^3P^o-^3P$	2 – 1	
	17	7.2751	7.2759	[12 891 081]	–	[26 635 100]	$1s2p-2p^2$	$^1P^o-^1D$	1 – 2	A4,B9
	1000*g*	7.7575	7.7573	0	–	[12 891 081]	$1s^2-1s2p$	$^1S-^1P^o$	0 – 1	F7
	g,M2		7.8038	0	–	[12 814 213]	$1s^2-1s2p$	$^1S-^3P^o$	0 – 2	
	50*g*	7.8069	7.8070	0	–	[12 809 088]	$1s^2-1s2p$	$^1S-^3P^o$	0 – 1	F7
	g,*bl*,M1	7.873	7.8721	0	–	[12 703 061]	$1s^2-1s2s$	$^1S-^3S$	0 – 1	P3
			33.023	[12 807 847]	–	[15 836 000]	$1s2p-1s4d$	$^3P^o-^3D$	0 – 1	
			33.037	[12 809 088]	–	[15 836 017]	$1s2p-1s4d$	$^3P^o-^3D$	1 – 2	
			33.090	[12 814 213]	–	[15 836 256]	$1s2p-1s4d$	$^3P^o-^3D$	2 – 3	
			33.950	[12 891 081]	–	[15 836 581]	$1s2p-1s4d$	$^1P^o-^1D$	1 – 2	
			42.588	[12 703 061]	–	[15 051 152]	$1s2s-1s3p$	$^3S-^3P^o$	1 – 2	
			42.615	[12 703 061]	–	[15 049 634]	$1s2s-1s3p$	$^3S-^3P^o$	1 – 1	
			42.622	[12 703 061]	–	[15 049 244]	$1s2s-1s3p$	$^3S-^3P^o$	1 – 0	
			44.265	[12 807 847]	–	[15 066 988]	$1s2p-1s3d$	$^3P^o-^3D$	0 – 1	
			44.288	[12 809 088]	–	[15 067 034]	$1s2p-1s3d$	$^3P^o-^3D$	1 – 2	
			44.319	[12 815 760]	–	[15 072 141]	$1s2s-1s3p$	$^1S-^1P^o$	0 – 1	
			44.378	[12 814 213]	–	[15 067 596]	$1s2p-1s3d$	$^3P^o-^3D$	2 – 3	
			45.929	[12 891 081]	–	[15 068 371]	$1s2p-1s3d$	$^1P^o-^1D$	1 – 2	
			88.86	[15 066 988]	–	[16 192 318]	$1s3d-1s5f$	$^3D-^3F^o$	1 – 2	
			88.87	[15 067 034]	–	[16 192 318]	$1s3d-1s5f$	$^3D-^3F^o$	2 – 3	
			88.91	[15 067 596]	–	[16 192 318]	$1s3d-1s5f$	$^3D-^3F^o$	3 – 4	
			88.97	[15 068 371]	–	[16 192 318]	$1s3d-1s5f$	$^1D-^1F^o$	2 – 3	
			123.61	[15 020 463]	–	[15 829 460]	$1s3s-1s4p$	$^3S-^3P^o$	1 – 2	
			123.71	[15 020 463]	–	[15 828 823]	$1s3s-1s4p$	$^3S-^3P^o$	1 – 1	
			123.73	[15 020 463]	–	[15 828 659]	$1s3s-1s4p$	$^3S-^3P^o$	1 – 0	
			126.93	[15 050 257]	–	[15 838 068]	$1s3s-1s4p$	$^1S-^1P^o$	0 – 1	
			127.10	[15 049 244]	–	[15 836 000]	$1s3p-1s4d$	$^3P^o-^3D$	0 – 1	
			127.16	[15 049 634]	–	[15 836 017]	$1s3p-1s4d$	$^3P^o-^3D$	1 – 2	
			127.37	[15 051 152]	–	[15 836 256]	$1s3p-1s4d$	$^3P^o-^3D$	2 – 3	
			129.92	[15 066 988]	–	[15 836 714]	$1s3d-1s4f$	$^3D-^3F^o$	1 – 2	
			129.92	[15 067 034]	–	[15 836 714]	$1s3d-1s4f$	$^3D-^3F^o$	2 – 3	
			130.02	[15 067 596]	–	[15 836 714]	$1s3d-1s4f$	$^3D-^3F^o$	3 – 4	
			130.15	[15 068 371]	–	[15 836 714]	$1s3d-1s4f$	$^1D-^1F^o$	2 – 3	
			130.82	[15 072 141]	–	[15 836 581]	$1s3p-1s4d$	$^1P^o-^1D$	1 – 2	
			281.16	[15 836 714]	–	[16 192 385]	$1s4f-1s5g$	F^o-G		
			517.67	[16 192 385]	–	[16 385 557]	$1s5g-1s6h$	$G-H^o$		
		899.63	899.67	[12 703 061]	–	[12 814 213]	$1s2s-1s2p$	$^3S-^3P^o$	1 – 2	K6
		943.19	943.16	[12 703 061]	–	[12 809 088]	$1s2s-1s2p$	$^3S-^3P^o$	1 – 1	K6
		954.4	954.33	[12 703 061]	–	[12 807 847]	$1s2s-1s2p$	$^3S-^3P^o$	1 – 0	K6
			1327.65	[12 815 760]	–	[12 891 081]	$1s2s-1s2p$	$^1S-^1P^o$	0 – 1	

Al XIII

H I isoelectronic sequence

Ground state 1s $^2S_{1/2}$

Ionization energy 18 584 144 ± 2 cm^{-1} (2304.1410 ± 0.0007 eV)

The ionization energy and the 2s and 2p levels are from Mohr's calculations. The levels for $n \geq 3$ are from Erickson's calculations, adjusted to Mohr's value for the ionization energy. We included estimated small corrections to the QED contributions for the 3s and 4s levels. The calculated wavelengths have estimated uncertainties in the range from less than unity to a few units in the last decimal place.

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Al XIII

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed	Calculated	Levels (cm^{-1}) Lower	Upper	Configurations	Terms	J Values	Ref.
	6g		5.435190	0	[18 398 621]	1s– 10p	$^2S-{}^2P^o$	1/2– 3/2	
	3g		5.435215	0	[18 398 537]	1s– 10p	$^2S-{}^2P^o$	1/2– 1/2	
	7g		5.448078	0	[18 355 096]	1s– 9p	$^2S-{}^2P^o$	1/2– 3/2	
	3g		5.448113	0	[18 354 980]	1s– 9p	$^2S-{}^2P^o$	1/2– 1/2	
	12g	5.4634	5.466200	0	[18 294 243]	1s– 8p	$^2S-{}^2P^o$	1/2– 3/2	A4
			5.466249	0	[18 294 079]	1s– 8p	$^2S-{}^2P^o$	1/2– 1/2	
	15g	5.4914	5.492852	0	[18 205 479]	1s– 7p	$^2S-{}^2P^o$	1/2– 3/2	A4
			5.492926	0	[18 205 234]	1s– 7p	$^2S-{}^2P^o$	1/2– 1/2	
	20g	5.5341	5.534429	0	[18 068 710]	1s– 6p	$^2S-{}^2P^o$	1/2– 3/2	A4
			5.534549	0	[18 068 320]	1s– 6p	$^2S-{}^2P^o$	1/2– 1/2	
	30g	5.6039	5.604794	0	[17 841 868]	1s– 5p	$^2S-{}^2P^o$	1/2– 3/2	A4
			5.605005	0	[17 841 196]	1s– 5p	$^2S-{}^2P^o$	1/2– 1/2	
	60g	5.7392	5.739127	0	[17 424 254]	1s– 4p	$^2S-{}^2P^o$	1/2– 3/2	A4
			5.739560	0	[17 422 939]	1s– 4p	$^2S-{}^2P^o$	1/2– 1/2	
	200g	6.0529	6.052529	0	[16 522 020]	1s– 3p	$^2S-{}^2P^o$	1/2– 3/2	A4
			6.053670	0	[16 518 905]	1s– 3p	$^2S-{}^2P^o$	1/2– 1/2	
	1000g	7.1709	7.170906	0	[13 945 238.5]	1s– 2p	$^2S-{}^2P^o$	1/2– 3/2	A4
	500g	7.1765	7.176317	0	[13 934 724.9]	1s– 2p	$^2S-{}^2P^o$	1/2– 1/2	A4
			25.59415	[13 934 724.9]	[17 841 867]	2p– 5d	$^2P^o-{}^2D$	1/2– 3/2	
			25.59683	[13 935 134.0]	[17 841 868]	2s– 5p	$^2S-{}^2P^o$	1/2– 3/2	
			25.60123	[13 935 134.0]	[17 841 196]	2s– 5p	$^2S-{}^2P^o$	1/2– 1/2	
			25.66174	[13 945 238.5]	[17 842 090]	2p– 5d	$^2P^o-{}^2D$	3/2– 5/2	
			28.65719	[13 934 724.9]	[17 424 251]	2p– 4d	$^2P^o-{}^2D$	1/2– 3/2	
			28.66052	[13 935 134.0]	[17 424 254]	2s– 4p	$^2S-{}^2P^o$	1/2– 3/2	
			28.67133	[13 935 134.0]	[17 422 939]	2s– 4p	$^2S-{}^2P^o$	1/2– 1/2	
			28.74018	[13 945 238.5]	[17 424 688]	2p– 4d	$^2P^o-{}^2D$	3/2– 5/2	
			38.65048	[13 934 724.9]	[16 522 015]	2p– 3d	$^2P^o-{}^2D$	1/2– 3/2	
			38.65652	[13 935 134.0]	[16 522 020]	2s– 3p	$^2S-{}^2P^o$	1/2– 3/2	
			38.70312	[13 935 134.0]	[16 518 905]	2s– 3p	$^2S-{}^2P^o$	1/2– 1/2	
			38.79261	[13 945 238.5]	[16 523 049]	2p– 3d	$^2P^o-{}^2D$	3/2– 5/2	
			75.5880	[16 518 905]	[17 841 867]	3p– 5d	$^2P^o-{}^2D$	1/2– 3/2	
			75.5949	[16 519 027]	[17 841 868]	3s– 5p	$^2S-{}^2P^o$	1/2– 3/2	
			75.6333	[16 519 027]	[17 841 196]	3s– 5p	$^2S-{}^2P^o$	1/2– 1/2	
			75.7533	[16 522 015]	[17 842 090]	3d– 5f	$^2D-{}^2F^o$	3/2– 5/2	
			75.7536	[16 522 020]	[17 842 090]	3p– 5d	$^2P^o-{}^2D$	3/2– 5/2	
			75.8063	[16 523 049]	[17 842 201]	3d– 5f	$^2D-{}^2F^o$	5/2– 7/2	
			110.4550	[16 518 905]	[17 424 251]	3p– 4d	$^2P^o-{}^2D$	1/2– 3/2	

Al XIII – Continued

Mult. No.	Rel. Int.	Vac. Wavelength (Å) Observed Calculated	Levels (cm^{-1}) Lower		Upper	Configurations	Terms	J Values	Ref.
		110.4695	[16 519 027]	–	[17 424 254]	3s – 4p	$^2S - ^2P^o$	1/2 – 3/2	
		110.6302	[16 519 027]	–	[17 422 939]	3s – 4p	$^2S - ^2P^o$	1/2 – 1/2	
		110.7822	[16 522 015]	–	[17 424 687]	3d – 4f	$^2D - ^2F^o$	3/2 – 5/2	
		110.7827	[16 522 020]	–	[17 424 688]	3p – 4d	$^2P^o - ^2D$	3/2 – 5/2	
		110.8824	[16 523 049]	–	[17 424 905]	3d – 4f	$^2D - ^2F^o$	5/2 – 7/2	
		238.704	[17 422 939]	–	[17 841 867]	4p – 5d	$^2P^o - ^2D$	1/2 – 3/2	
		239.327	[17 424 251]	–	[17 842 090]	4d – 5f	$^2D - ^2F^o$	3/2 – 5/2	
		239.328	[17 424 254]	–	[17 842 090]	4p – 5d	$^2P^o - ^2D$	3/2 – 5/2	
		239.513	[17 424 687]	–	[17 842 201]	4f – 5g	$^2F^o - ^2G$	5/2 – 7/2	
		239.514	[17 424 688]	–	[17 842 201]	4d – 5f	$^2D - ^2F^o$	5/2 – 7/2	
		239.600	[17 424 905]	–	[17 842 268]	4f – 5g	$^2F^o - ^2G$	7/2 – 9/2	
		Air Wavelength (Å)							
		9896.6	[13 935 134.0]	–	[13 945 238.5]	2s – 2p	$^2S - ^2P^o$	1/2 – 3/2	
		Wavenumber (cm^{-1})							
		409.1	[13 934 724.9]	–	[13 935 134.0]	2p – 2s	$^2P^o - ^2S$	1/2 – 1/2	

WAVELENGTHS AND ENERGY LEVELS OF ALUMINUM

3. Finding List for Al I through Al III

Wavelength (Å)	Int.	Spectrum
Vacuum		
137.46	g,a	III
137.83	g,a	III
138.10	g,a	III
138.83	g,a	III
143.95	g,a	III
144.17	g,a	III
145.88	3a	I
146.26	3a	I
150.40	2a	I
150.94	3a	I
151.84	5a	I
152.32	3a	I
152.72	6a	I
152.85	3a	I
153.06	2a	I
153.25	2a	I
153.62	2a	I
153.88	4a	I
154.26	1a	I
154.45	1a	I
154.84	5a	I
154.99	2a	I
155.10	2a	I
155.45	20a	I
155.83	10a	I
156.05	9a	I
156.25	7a	I
156.65	2a	I
156.72	2a	I
156.87	2a	I
157.03	1a	I
157.13	3a	I
157.27	9a	I
157.44	2a	I
157.64	1a	I
157.86	2a	I
157.98	2a	I
158.08	2a	I
159.25	6a	I
169.07	9g	III
169.73	6	III
169.82	7	III
170.11	10g,bl	III
170.24	8	III
170.49	7	III
170.57	6	III
171.04	2	III
171.12	3	III
171.37	6	III
172.1	2	III
172.31	2	III
172.45	2	III
172.62	7	III
175.02	6	III
486.95	70g	III
511.215	250g	III
560.390	500g	III
644.3339c		III
645.3063c		III
670.144	100	III
671.198	200	III
677.0819c		III
678.1548c		III
678.1564c		III

Wavelength (Å)	Int.	Spectrum
683.529	2g	II
689.936	5g	II
695.817	500g	III
696.212	400g	III
699.489	10g	II
714.695	20g	II
725.716	200	III
726.948	300	III
739.6707c		III
740.9514c		III
740.9550c		III
741.182	25g	II
794.475	20g	II
855.040	400	III
856.768	500	III
862.382	1g,E2	III
892.056	400	III
893.905	450	III
905.152	20	II
908.342	1E2	II
910.916	10	II
911.497	10	II
911.9457	40	II
919.672	30	II
920.3166	50	II
920.7160	50	II
921.3670	75	II
932.4075	20	II
932.9385	40	II
933.4077	50	II
933.9382	75	II
934.0150	100	II
935.0198	100	II
935.2752	100g	II
952.6301	75	II
953.1822	100	II
954.3050	125	II
954.8466	100	II
955.9766	125	II
985.9802	100	II
986.5712	125	II
987.7772	150	II
989.0525	75	II
989.6475	100	II
990.8623	125	II
1047.8893	150	II
1048.5588	170	II
1049.9233	190	II
1054.6031	100	II
1055.2802	125	II
1056.6613	150	II
1071.730c		III
1071.757c		III
1118.173c		III
1118.202c		III
1118.353c		III
1132.726	35	II
1142.9529	100	II
1157.0881	125	II
1158.2103	100	II
1162.66	10	III
1169.860	3E2	II
1177.4371	125	II
1179.3541	125	II
1181.907	36g,a	I
1182.01	26g,a	I

Wavelength (Å)	Int.	Spectrum
1182.379	57g,a	I
1185.660	81g,a	I
1185.79	57g,a	I
1186.346	60g,a	I
1189.1854	125	II
1190.0518	150	II
1190.939	94g,a	I
1191.34	75g,a	I
1191.8111	190	II
1192.211	130g,a	I
1192.320	140g,a	I
1192.60		III
1193.807	86g,a	I
1194.955	62g,a	I
1197.73	36g,a	I
1198.482	65g,a	I
1198.686	125g,a	I
1199.34	86g,a	I
1199.959	120g,a	I
1200.095	91g,a	I
1200.459	96g,a	I
1200.853	150g,a	I
1202.066	34g,a	I
1202.463	160g,a	I
1208.3522	150	II
1209.165	55g,a	I
1209.1914	100	II
1210.0817	125	II
1210.803	110g,a	I
1211.8983	150	II
1211.953	125	II
1212.33	105g,a	I
1213.425	165g,a	I
1213.954	78g,a	I
1214.553	265g,a	I
1215.084	96g,a	I
1216.212	260g,a	I
1229.783	160g,a	I
1231.484	455g,a	I
1234.85	1000g,a	I
1235.587	50g,a	I
1237.298	100g,a	I
1237.442	590g,a	I
1237.986	230g,a	I
1238.628	550g,a	I
1238.810	260g,a	I
1239.162	775g,a	I
1240.352	1035g,a	I
1240.531	425g,a	I
1254.933c		III
1254.969c		III
1255.284c		III
1258.8585	125	II
1262.248c		III
1262.440c		III
1266.6481	150	II
1269.956	285g,a	I
1271.765	620g,a	I
1274.05		III
1279.45	1780g,a	I
1284.454	75g,a	I
1286.325	155g,a	I
1286.789	1100g,a	I
1287.532	395g,a	I
1287.946	730g,a	I
1288.210	570g,a	I

Wavelength (Å)	Int.	Spectrum
1288.650	2090g,a	I
1289.393	335g,a	I
1289.812	1890g,a	I
1290.076	475g,a	I
1336.05		III
1350.1782	150	II
1352.857	100	III
1368.908	705g,a	I
1371.010	1130g,a	I
1371.2401	150	II
1379.670	600	III
1384.140	800	III
1386.94		III
1387.93		III
1397.80	2350g,a	I
1402.87		III
1413.156	4370g,a	I
1414.240	1150g,a	I
1415.401	1870g,a	I
1416.481	1000g,a	I
1417.222	630g,a	I
1419.479	1040g,a	I
1425.037	800g,a	I
1431.018	380g,a	I
1431.865	315g,a	I
1434.155	500g,a	I
1439.311c		III
1439.726c		III
1473.40		III
1478.10		III
1491.45		III
1532.604c		III
1534.488c		III
1539.8303	340	II
1555.943	1	II
1563.580	1	II
1573.003	3	II
1580.919	1	II
1584.708	4	II
1596.00		III
1596.059	112	II
1599.410	20	II
1599.639c		III
1599.697c		III
1600.642c		III
1605.7661	700	III
1611.8141	100	III
1611.8735	800	III
1616.415	10	II
1618.3990	50	II
1625.6271	125	II
1644.2348	100	II
1644.8089	100	II
1670.7867	400g	II
1681.8089	80	II
1686.2505	100	II
1686.676c		III
1688.958c		III
1719.4400	340	II
1721.2435	255	II
1721.2714	365	II
1724.9519	255	II
1724.9838	365	II
1731.836c		III
1734.243c		III
1734.253c		III

Wavelength (Å)	Int.	Spectrum
1739.7382	50	II
1750.612	60	II
1760.1044	210	II
1761.9751	190	II
1762.899	100g	I
1763.8692	255	II
1763.9521	315	II
1765.636	200g	I
1765.8150	190	II
1766.385	200g	I
1767.7308	225	II
1769.140	200g	I
1772.802	10	II
1774.002	25	II
1774.770	10	II
1776.19	10	II
1776.975	100	II
1777.825	3	II
1807.4168	70	II
1807.5851	20	II
1807.651	1	II
1818.352	50	II
1818.392	3	II
1819.285	1	II
1820.124	2	II
1828.5876	290	II
1832.8374	225	II
1834.8077	170	II
1836.9635	60	II
1839.39	2	II
1848.888	1	II
1849.15	2	II
1854.7164	1000g	III
1855.8054	90	II
1855.9286	190	II
1856.0957	90	II
1856.2741	30	II
1858.0262	315	II
1859.9796	110	II
1862.081	5	II
1862.3111	400	II
1862.7895	600g	III
1877.04	5	II
1878.504	8	II
1897.401	10	II
1897.460	3	II
1897.500	1	II
1899.1943	25	II
1904.326	8	II
1906.4082	25	II
1906.596	4	II
1906.674	8	II
1910.8252	80	II
1911.013	15	II
1911.817c		III
1913.166c		III
1922.16	1	II
1924.7537	50	II
1924.825	30	II
1924.879	10	II
1926.0291	60	II
1926.948	20	II
1927.070	10	II
1927.13	1	II
1929.9775	150	II

Wavelength (Å)	Int.	Spectrum
1931.0481	125	II
1932.268	1000g,a	I
1932.3768	150	II
1934.5032	225	II
1934.7129	125	II
1935.8404	300	III
1935.9489	200	III
1936.457	1200g,a	I
1936.9066	125	II
1939.2606	150	II
1958.247	8	II
1958.77	1	II
1959.00	0	II
1960.322	3	II
1960.646	3	II
1960.846	10	II
1962.5904	70	II
1962.645	8	II
1962.6910	60	II
1962.7349	70	II
1962.763	50	II
1964.990	40	II
1965.316	10	II
1983.650	10	II
1988.699	3	II
1990.5310	315	II
1991.05	1	II
Air		
2013.959c		III
2013.984c		III
2015.864	70	II
2016.053	150	II
2016.193	80	II
2016.234	150	II
2016.334	50	II
2016.369	100	II
2022.081	40	II
2036.75	1	II
2039.22	1	II
2039.40	5	II
2044.27	2	II
2044.41	1	II
2047.63	5	II
2047.79	5	II
2047.87	1	II
2073.633c		III
2073.684c		III
2074.009	200	II
2079.62	g,a	I
2079.87	g,a	I
2080.15	g,a	I
2080.46	g,a	I
2080.79	g,a	I
2081.15	g,a	I
2081.40	g,a	I
2081.481	15	II
2081.57	g,a	I
2082.01	g,a	I
2082.50	g,a	I
2082.53	g,a	I
2083.10	g,a	I
2083.75	g,a	I
2084.48	g,a	I

Wavelength (Å)	Int.	Spectrum
2085.24	g,a	I
2085.32	g,a	I
2086.23	g,a	I
2086.864	30	II
2087.06	g,a	I
2087.36	g,a	I
2088.66	g,a	I
2089.15	g,a	I
2089.163c		III
2090.16	g,a	I
2091.70	g,a	I
2091.92	g,a	I
2092.667c		III
2093.3	1	I
2094.08	g,a	I
2094.264	700	II
2094.744	150	II
2094.790	300	II
2094.84	g,a	I
2095.100	100	II
2095.140	200	II
2096.62	g,a	I
2098.75	g,a	I
2099.10	g,a	I
2099.709	80	II
2099.79	g,a	I
2102.58	g,a	I
2102.85	g,a	I
2103.66	g,a	I
2103.71	g,a	I
2107.55	g,a	I
2108.62	g,a	I
2109.99	g,a	I
2113.61	g,a	I
2114.968	g,a	I
2116.56	g,a	I
2118.312	g,a	I
2121.59	g,a	I
2123.362	1g	I
2127.30	g,a	I
2129.663	1g	I
2132.39	g,a	I
2134.733	2g	I
2142.39	g,a	I
2145.555	3g	I
2147.54	g,a	I
2150.699	5g	I
2154.635	1	III
2160.383	3	I
2164.55	g	I
2164.915	2	I
2167.356c		III
2167.385c		III
2168.805	1g	I
2169.81	g	I
2174.028	1g	I
2177.396	4	I
2180.996	5	I
2192.604	500	II
2194.189	20	II
2194.245	70	II
2195.456	300	II
2195.502	300	II
2199.150	1g	I
2204.590	2g	I

Wavelength (Å)	Int.	Spectrum
2204.660	2g	I
2209.66	1d	III
2210.046	2g	I
2213.56	2d	III
2243.045	300	II
2257.999	2g	I
2263.462	4g	I
2263.731	2g	I
2266.014	3	I
2267.53	4	I
2269.096	4g	I
2269.220	2g	I
2285.126	50	II
2285.470	10	II
2285.69	5	II
2299.47	3d	III
2311.035	4	I
2312.225	1	II
2312.491	5	I
2313.526	6	I
2313.768	100	II
2314.983	4	I
2317.482	7	I
2319.057	5	I
2321.562	9	I
2324.199	350	II
2325.436	10	II
2325.494	300	II
2326.445	10	II
2326.496	300	II
2328.20	3	II
2344.69	7	II
2345.47	3	II
2345.92	3	II
2347.516	30	II
2365.460	10	II
2367.052	8g	I
2367.611	8	I
2368.112	8	I
2369.304	10	I
2370.225	9	I
2370.726	6	I
2372.070	3g	I
2373.124	8g	I
2373.349	2g	I
2373.571	8	I
2374.496	4	I
2378.368	3g	I
2389.035	5	II
2390.692	25	II
2391.276	15	II
2392.078	50	II
2392.234	10	II
2393.760	100	II
2398.98	5d	III
2422.44	1	III
2423.05	5	I
2424.77	5	I
2425.05	1	I
2425.596	5	II
2427.742	50	II
2452.584	30	II
2453.423	100	II
2455.177	200	II
2457.187	100	II

Finding List for Al I through Al III — Continued

Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum
2458.037	300	II	2688.743	500	II	3089.82	1	I	3660.535*c*		III
2458.88	3	II	2705.770	50	II	3092.7099	26*g*	I	3702.106	10	III
2459.809	500	II	2706.435	300	II	3092.8386	20*g*	I	3703.219	30	II
2459.83	5	I	2707.452	500	II	3135.848	75	II	3713.123	11	III
2465.74	4	I	2709.593	1000	II	3180.111	3*d*	III	3731.952	10	II
2466.28	3	II	2719.884	350	II	3183.824	4*d*	III	3733.908	20	II
2473.008	25	II	2723.098	500	II	3191.529	2	II	3734.567	3	II
2475.252	1500	II	2740.980	4	I	3203.39	4	I	3734.715	2	II
2476.322	300	II	2748.065	3	I	3241.59	3	I	3738.015	50	II
2485.35	5	II	2748.925	150	II	3251.60	2	I	3753.10	2	II
2497.886	10	II	2760.844	500	II	3275.767	80	II	3771.205*c*		II
2504.25	5	II	2762.464	500	II	3282.20	3	I	3771.938*c*		II
2513.145	20	II	2762.815	9*d*	III	3283.316	2*d*	III	3772.237*c*		II
2513.305	5	I	2775.19	1	I	3287.302	3*d*	III	3842.037	6	II
2519.222	4	I	2777.63	2	I	3313.344	80	II	3842.213	4	II
2519.514	1	I	2801.178	500	II	3313.470	2	II	3842.317	2	II
2520.579	45	II	2805.518	150	II	3314.756	2	II	3859.33	6	II
2524.401*c*		III	2816.185	4000	II	3314.883	40	II	3866.160	8	II
2524.477*c*		III	2820.040	125	II	3314.981	1	II	3870.057	2	II
2525.244*c*		III	2831.706*c*		III	3315.516	2	II	3900.675	100	II
2526.486	1000	II	2834.668*c*		III	3315.608	10	II	3931.996	5	I
2532.092	50	II	2837.856	2	I	3348.517	9	III	3935.677	4	I
2532.629	300	II	2837.963	7	I	3350.885	8	III	3938.021	2*d*	II
2533.117	5	II	2840.099	7	I	3351.462	50	II	3939.066	1*d*	II
2533.170	45	II	2840.205	2	I	3428.894	30	II	3944.0058	24*g*	I
2540.179	150	II	2868.494	1000	II	3439.347	6*g*	I	3946.406	2*d*	II
2540.706	100	II	2868.92	1	I	3443.640	9*g*	I	3961.5200	26*g*	I
2545.606	450	II	2871.57	2	I	3444.865	6*g*	I	3979.988*c*		II
2549.314	150	II	2876.819*c*		III	3452.657	2*g*	I	3980.14	5*d*	III
2550.217	450	II	2877.815*c*		III	3458.216	6*g*	I	3980.871*c*		II
2552.109	500	II	2881.450	500	II	3463.63	5	II	3981.256*c*		II
2556.007	50	II	2884.106	10	II	3469.80	1	I	3988.248*c*		II
2556.793	300	II	2894.228	3	I	3479.806	5	I	3989.589*c*		II
2557.707	500	II	2902.08		II	3482.628	5	I	3990.421*c*		II
2559.627	1000	II	2902.08		II	3516.05	2	II	3995.838	40	II
2565.694	150	II	2902.258	2	I	3524.869*c*		III	3996.075	10	II
2567.984	10*g*	I	2903.19		II	3524.950*c*		III	3996.143	30	II
2575.094	10*g*	I	2907.05	10	III	3534.856	5	II	3996.182	5	II
2575.393	3*g*	I	2913.267	3	I	3552.00	3	II	3996.323	5	II
2586.829	150	II	2915.66	2	I	3586.557	200	II	3996.370	20	II
2596.992	300	II	2927.930	5	I	3586.708	15	II	3998.164	2	III
2622.926	15	II	2936.04	3	I	3586.811	2	II	4001.376	1	III
2627.597	350	II	2961.06	2	III	3586.912	50	II	4005.7	2	II
2631.546	100	II	2994.277	50	II	3586.936	25	II	4009.58	2	II
2633.95	2	I	2995.525	400	II	3587.068	100	II	4026.5	20	II
2635.020	250	II	2996.29	3	I	3587.165	5	II	4031.135	2	II
2636.03	2	I	2998.150	500	II	3587.195	10	II	4031.210	1	II
2636.32	1	I	3001.790	30	II	3587.309	30	II	4031.633	1*d*	II
2636.724	500	II	3005.02	1	I	3587.342	50	II	4039.302	2	II
2637.689	3000	II	3022.789	15	II	3587.450	70	II	4039.397	1	II
2638.178	1000	II	3024.077	200	II	3597.50	4	II	4056.8	2	II
2638.255	2500	II	3026.761	500	II	3601.628	14	III	4082.450	5	III
2638.627	500	II	3041.276	750	II	3601.926	11	III	4088.611	6	III
2638.690	2000	II	3050.073	13	I	3612.356	13	III	4142.37	5*d*	III
2640.408	450	II	3054.679	5	I	3649.184	10	II	4149.915	12	III
2647.49	6	I	3057.144	14	I	3649.232	5	II	4150.173	12	III
2648.61	4	I	3059.029	4	I	3651.065	40	II	4150.91	*bl*	III
2650.073	500	II	3059.924	4	I	3651.096	30	II	4153.897*c*		III
2652.484	10*g*	I	3064.290	7	I	3652.052*c*		III	4153.930*c*		III
2657.406	3	I	3065.12	1	I	3652.094*c*		III	4159.407	1	II
2659.33	3	I	3066.145	5	I	3654.981	35	II	4159.450	2	II
2660.393	10*g*	I	3074.691	750	II	3654.998	50	II	4159.728	3	II
2669.157	2500*g*	II	3082.1529	24*g*	I	3656.319	2	II	4159.809	2	II
2671.811	45	II	3087.02	5	I	3658.3	1*d*	III	4160.239	5	II
2683.274	500	II	3088.516	800	II	3660.510*c*		III	4160.263	6	II

Finding List for Al I through Al III — Continued

Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum
4168.424	3	II	4902.77	10	II	6226.18	50	II	6381.68		I
4168.511	3	II	4904.10	5*d*	III	6231.745	75	II	6387.24		I
4189.73	*bl*	III	4918.98	6	II	6243.36	100	II	6387.79		I
4226.813	50	II	4962.10	6	II	6301.85	2*d*	III	6394.18		I
4226.918	2	II	5000.97	6	II	6324.67		I	6394.76		I
4227.420	10	II	5085.02	8	II	6325.23		I	6402.16		I
4227.492	50	II	5093.65	5	II	6325.77		I	6402.71		I
4227.545	5	II	5100.34	3	II	6325.82		I	6411.25		I
4227.875	2	II	5107.520	6	I	6326.35		I	6411.83		I
4227.945	5	II	5107.943	4	I	6326.41		I	6421.84		I
4227.999	50	II	5144.413	500	II	6326.98		I	6422.40		I
4240.708	10	II	5144.884	500	II	6327.07		I	6434.16		I
4255.12	2	I	5145.008	300	II	6327.64		I	6434.70		I
4282.97	2	II	5145.654	500	II	6327.75		I	6448.62		I
4307.203	5	II	5151.01	5*d*	III	6328.29		I	6449.16		I
4332.0	2	II	5158.177	200	II	6328.47		I	6465.86		I
4346.866	2	II	5158.309	300	II	6329.02		I	6486.51		I
4346.918	3	II	5163.89	5*d*	III	6329.25		I	6487.08		I
4347.236	300	II	5170.60	1*d*	III	6329.80		I	6495.45		II
4347.318	200	II	5260.11	3*d*	III	6330.06		I	6511.66		I
4347.785	300	II	5276.42	4	II	6330.61		I	6512.27		I
4347.812	200	II	5276.81	4	II	6330.95		I	6542.67		I
4356.725	200	II	5277.68	4	II	6331.47		I	6543.12	2*d*	III
4356.811	150	II	5278.62	6	II	6331.88		I	6543.24		I
4357.562	4*d*	III	5280.214	8	II	6332.41		I	6556.18	2*d*	III
4364.642	5*d*	III	5283.735	100	II	6332.88		I	6581.55		I
4432.82	5	II	5285.842	30	II	6333.40		I	6582.11		I
4447.803	200	II	5310.76	4	II	6333.97		I	6609.64		II
4479.892	12	III	5312.32	10	II	6334.49		I	6631.20		I
4479.968	12	III	5316.075	15	II	6335.09		I	6631.74		I
4489.870	10	II	5324.61	8	II	6335.65		I	6696.015	13	I
4512.564	13	III	5371.84	12	II	6335.701	30	II	6696.12		I
4528.942	11	III	5388.48	2	II	6336.34		I	6696.39	2	II
4529.194	14	III	5502.88	6	II	6336.89		I	6696.76		I
4585.817	500	II	5557.063	10	I	6337.67		I	6698.673	11	I
4588.082	5	II	5557.948	8	I	6338.22		I	6699.46	1	II
4588.191	400	II	5593.302	800	II	6339.11		I	6777.06*c*		II
4589.674	200	II	5613.291	100	II	6339.63		I	6777.10*c*		II
4589.742	300	II	5696.603	17	III	6340.66		I	6777.12*c*		II
4609.7	7	II	5722.728	16	III	6341.19		I	6785.2	1	I
4610.650*c*		II	5853.62	100	II	6342.35		I	6816.69	10	II
4611.00*c*		II	5861.53	80	II	6342.93		I	6823.48	50	II
4629.7	7	II	5867.81	50	II	6344.17		I	6837.14	80	II
4631.5	5	II	5971.980	80	II	6344.73		I	6906.4	3	I
4633.2	5	II	5999.70	3	II	6346.15		I	6917.93	10	II
4635.763	30	II	5999.83	2	II	6346.68		I	6919.96	1	II
4639.326	100	II	6001.18	2	II	6348.30		I	7042.06	100	II
4639.384	200	II	6001.76	60	II	6348.87		I	7056.60	50	II
4639.725	300	II	6001.88	40	II	6350.67		I	7063.64	10	II
4639.833	200	II	6006.410	200	II	6351.21		I	7083.968	5	I
4640.362	400	II	6055.21	5	III	6353.26		I	7084.644	6	I
4640.384	300	II	6059.84	4	III	6353.82		I	7132.89*c*		II
4647.321	10	II	6061.124	30	II	6356.12		I	7135.63*c*		II
4648.611	400	II	6066.32	15	II	6356.66		I	7138.81	2	II
4650.550	150	II	6066.44	10	II	6359.26		I	7361.568	8	I
4650.654	200	II	6068.43	40	II	6359.81		I	7362.297	9	I
4653.0	2	II	6068.53	25	II	6362.74		I	7449.42	50	II
4655.05	2	II	6073.198	50	II	6363.29		I	7471.41	90	II
4663.056	1000	II	6181.57	50	II	6366.60		I	7526.2	2	II
4666.800	400	II	6181.68	60	II	6367.14		I	7554.162	1	I
4701.148	5	III	6182.262	500	II	6370.91		I	7563.214	3	I
4701.412	6	III	6182.447	300	II	6371.47		I	7606.159	5	I
4898.52	10	II	6183.42	1000*d*	II	6375.71		I	7614.820	7	I
4898.76	5	II	6201.463	300	II	6376.26		I	7615.339	1	I
4899.64	6	II	6201.655	200	II	6381.14		I	7624.48	5	II

Finding List for Al I through Al III — Continued

Wavelength (Å)	Int.	Spectrum
7627.85	10	II
7635.33	20	II
7635.37	7d	III
7660.259	6	III
7681.971	7	III
7709.78	1	II
7812.31	5	II
7815.83	10	II
7823.72	20	II
7835.309	11	I
7836.134	12	I
7881.790	9	III
7882.516	6	III
7905.513	8	III
7921.66	2d	III
7993.048	5	I
8003.186	7	I
8065.968	6	I
8075.353	8	I
8076.289	2	I
8086.91	5	II
8119.72	15	II
8121.89	2	II
8122.08	5	II
8123.52	1	II
8160.15	30	II
8243.59	8d	III
8275.11	9d	III
8301.62	3d	III
8304.02	2d	III
8324.56	2d	III
8354.318	100	II
8359.23	5	II
8359.492	50	II
8363.251	5	II
8363.469	50	II
8640.705	100	II
8671.06	5	II
8671.28	10	II
8674.92	20	II
8675.28	10	II
8680.26	30	II
8680.36	25	II
8693.98	4d	III
8772.866	13	I
8773.896	14	I
8828.909	8	I
8841.277	10	I
8858.39	10	II
8858.77	5	II
8912.900	7	I
8923.555	9	I
8925.504	4	I
9089.906	5	I
9126.14c		II
9139.950	6	I
9163.261	2	I
9249.41	10	II
9286.578	10	II
9286.794	20	II
9288.145	30	II
9288.550	20	II
9290.649	50	II
9290.747	40	II
9331.546	30	II

Wavelength (Å)	Int.	Spectrum
9331.979	20	II
9571.52	8	III
9605.99	9	III

Wavenumber (cm^{-1})	Int.	Spectrum
9921.57	60	II
9920.55	10	II
9920.35	5	II
9891.23	40	II
9890.43	5	II
9890.08	2	II
9876.28	5	II
9283.919	8	I
9272.138	9	I
9268.077	4	I
9194.596	10	I
9178.761	11	I
8887.641	16	II
8883.937	630	I
8882.566	440d	I
8703.98	2	II
8047.353	41	II
7842.425	8	I
7841.048	13d	I
7836.521	17	I
7617.906	71000	I
7617.868	100000	I
7602.074	36300	I
7602.029	50000	I
7231.893	3	I
7120.021	36	II
7119.710	36	II
7119.514	14	II
7114.378	35	II
7114.185	110	II
7114.066	15	II
7113.966	16	II
7113.877	62	II
7101.582	6	II
7101.386	30	II
7101.268	56	II
7101.192	182	II
7101.105	85	II
6909.618	35	II
6512.586	18	II
6512.294	15	II
6512.085	11	II
6506.941	23	II
6506.780	52	II
6506.648	2	II
6506.564	10	II
6506.491	22	II
6506.440	21	II
6494.145	4	II
6494.003	22	II
6493.954	10	II
6493.820	85	II
6493.743	24	II
6493.711	40	II
6493.644	14	II
6265.279	3	I
6260.76	3	I
6260.72	3	I

Wavenumber (cm^{-1})	Int.	Spectrum
6260.67	3	I
6153.709	2	II
6153.517	2	II
6153.411	3	II
6153.332	3	II
6153.286	3	II
6153.119	9	II
6153.036	5	II
6152.981	2	II
6148.259	19	II
6147.848	4	II
6147.814	5	II
6147.774	7	II
6147.731	8	II
6141.385	3	II
6141.325	4	II
6141.280	4	II
6141.243	5	II
6141.204	8	II
6141.114	17	II
6141.049	5	II
6140.989	5	II
6140.909	5	II
6140.805	4	II
6140.678	2	II
5979.595	11500	I
5968.366	13200	I
5968.355	11500	I
5968.305	10000	I
5968.290	8900	I
5963.759	2300	I
5909.536	15	II
5909.01	8	II
5739.366	9	II
5739.045	3	II
5738.940	85	II
5738.856	6	II
5738.794	17	II
5738.731	3	II
5738.682	6	II
5738.582	2	II
5716.221	8	II
5716.082	6	II
5715.976	7	II
5715.797	6	II
5715.744	5	II
5698.600	5	II
5698.551	2	II
5698.484	4	II
5698.406	4	II
5698.280	4	II
5698.242	4	II
5698.195	3	II
5698.120	2	II
5648.478	65	I
5645.612	30	I
5628.964	631	II
5628.890	1778	II
5628.862	1072	II
5628.770	3715	II
5628.646	437	II
5628.590	1000	II
5628.448	178	II
5616.167	1072	II
5616.110	1148	II

Wavenumber (cm^{-1})	Int.	Spectru
5616.043	447	II
5615.953	105	II
5615.812	2188	II
5615.651	1072	II
5610.522	562	II
5610.307	832	II
5610.006	1000	II
5461.411	126	II
5401.16	2	II
5328.975	18	II
5185.267	1	I
5179.362	3	I
4901.690	4	I
4897.159	4	I
4897.128	3	I
4897.091	3	I
4739.598	4700	I
4723.760	12000	I
4713.876	2	I
4502.290	347	II
4408.464	1	I
4405.610	4	I
4403.958	3	I
4403.932	3	I
4403.905	3	I
4403.872	4	I
4369.802	5	II
4342.218	3	II
4342.061	3	II
4341.935	2	II
4238.571	4	II
4238.448	66	II
4238.389	145	II
4238.325	195	II
4238.261	1820	II
4238.114	23	II
4237.956	302	II
4237.933	170	II
4237.817	107	II
4237.723	95	II
4237.723	95	II
4237.663	19	II
4237.540	18	II
4237.440	31	II
4237.238	11	II
4237.135	2	II
4225.610	12	II
4225.530	15	II
4225.485	66	II
4225.453	48	II
4225.405	11	II
4225.148	20	II
4224.994	1023	II
4224.901	407	II
4224.759	324	II
4224.659	126	II
4224.501	91	II
4224.441	145	II
4224.378	31	II
4224.317	15	II
4219.349	120	II
4218.957	309	II
4218.856	263	II
4218.796	191	II
4001.160	9	I

Finding List for Al I through Al III — Continued

Wavenumber (cm^{-1})	Int.	Spectrum
3995.255	16	I
3902.323	25d	I
3894.426	1	I
3800.972	1	I
3881.238	1	II
3799.513	2	II
3799.463	1	II
3799.403	1	II
3799.206	5	II
3799.063	2	II
3793.142	2	II
3793.077	2	II
3793.009	7	II
3792.848	3	II
3484.329	5	II
3477.788	13	II
3296.619	16	II
3253.231	58	II
3169.285	13	II
2960.94	10	I
2956.90	10d	I
2806.781	17	II
2806.715	41	II
2806.679	23	II
2806.601	66	II
2806.573	35	II
2806.469	13	II
2806.421	26	II
2800.447	23	II
2800.353	33	II
2800.138	25	II
2800.062	40	II
2799.946	27	II
2797.061	15	II
2796.850	19	II
2796.559	22	II
2776.887	2	I
2775.287	6	I
2685.95	10d	I
2683.51	10d	I
2588.472	10000	I
2582.565	4000	I
2556.354	4000	I
2389.986	3200	I
2389.967	3200	I
2385.473	2000	I
2385.446	2500	I
2385.418	3200	I
2385.383	4000	I
2202.15	100d	I
2199.351	20	II
2199.321	30	II
2199.276	21	II
2199.233	52	II
2199.156	25	II
2193.359	16	II
2193.019	19	II
2192.962	18	II
2192.823	13	II
2192.725	23	II
2192.678	23	II
2192.655	20	II
2192.501	16	II
2161.34	130d	I
2140.736	26	II
2140.713	25	II
1961.756	1250	I
1959.932	1600	I
1959.905	1400	I
1959.883	1250	I
1955.851	250	I
1939.857	117	II
1939.812	43	II
1939.787	162	II
1939.747	29	II
1939.666	23	II
1937.157	17	II
1937.126	21	II
1937.066	25	II
1936.961	27	II
1936.775	17	II
1936.608	76	II
1936.591	76	II
1936.469	81	II
1936.215	25	II
1934.98c		II
1934.695	18	II
1934.592	28	II
1934.457	45	II
1934.223	28	II
1934.177	66	II
1934.110	22	II
1934.067	54	II
1872.437	500	I
1866.530	1000	I
918.385c		I
914.333	2	I
838.565	3	I
831.374	1	I
830.957	2	I
815.375	4	I
810.704	6	I

4. Finding List for Al IV through Al XIII

Wavelength (Å)	Int.	Spectrum
Vacuum		
[5.435190]	6g	XIII
[5.435215]	3g	XIII
[5.448078]	7g	XIII
[5.448113]	3g	XIII
[5.466200]	12g	XIII
[5.466249]	12g	XIII
[5.492852]	15g	XIII
[5.492926]	15g	XIII
[5.534429]	20g	XIII
[5.534549]	20g	XIII
[5.604794]	30g	XIII
[5.605005]	30g	XIII
[5.739127]	60g	XIII
[5.739560]	60g	XIII
[6.0000]	10g	XII
[6.0134]	15g	XII
[6.0322]	20g	XII
[6.052529]	200g	XIII
[6.053670]	200g	XIII
[6.0598]	25g	XII
[6.1028]	35g	XII
[6.1755]	50g	XII
[6.1773]	2g	XII
[6.3139]	100g	XII
[6.3176]	5g	XII
[6.6348]	400g	XII
[6.6447]	20g	XII
6.7435	3g	XI
6.7775	9	XI
6.7921	13g	XI
6.8045	27	XI
6.8215	5bl	XI
6.8277	3bl	XI
6.8463	3	XI
[7.170906]	1000g	XIII
[7.176317]	500g	XIII
[7.1929]	13	XII
[7.2319]	6	XII
[7.2509]	4	XII
[7.2545]	3	XII
[7.2560]	3	XII
[7.2581]	2	XII
[7.2638]	2	XII
[7.2611]	2	XII
[7.2608]	2	XII
[7.2629]	2	XII
[7.2605]	2	XII
[7.2759]	17	XII
[7.7573]	1000g	XII
7.774	10	XI
7.7963		XI
[7.8038]	g,M2	XII
7.8069		XI
[7.8070]	50g	XII
7.8471	g	XI
7.8571		XI
[7.8721]	bl,M1	XII
7.8756		XI
7.929	g	XI
7.934	90bl	X
7.951	150bl	X
[25.59415]		XIII
[25.59683]		XIII
[25.60123]		XIII
[25.66174]		XIII
[28.65719]		XIII
[28.66052]		XIII
[28.67133]		XIII
[28.74018]		XIII
29.416	2g	XI
29.793	3g	XI
30.376	4g	XI
31.313	5g	XI
31.426	1	XI
31.483	2	XI
32.068	2	XI
32.128	3	XI
33.007	9g	XI
[33.023]		XII
[33.037]		XII
[33.090]		XII
33.109	3	XI
33.172	5	XI
[33.950]		XII
34.994	9	XI
35.065	10	XI
35.163	2	XI
35.239	2	XI
36.675	12g	XI
38.255	100	X
[38.65048]		XIII
[38.65652]		XIII
[38.70312]		XIII
[38.79261]		XIII
39.091	10	XI
39.180	12	XI
39.530	6	XI
39.623	7	XI
40.421	25	X
41.543	20g	IX
41.730	100	X
[42.588]		XII
[42.615]		XII
[42.622]		XII
43.549	10g	IX
[44.265]		XII
[44.288]		XII
[44.319]		XII
[44.378]		XII
44.704	60g	IX
44.743	80g	IX
44.902	10	X
[45.929]		XII
47.755	10g	IX
47.856	50g	IX
48.297	15g	XI
48.338	15g	XI
49.854	100	IX
49.916	100	IX
50.670	50	X
50.717	75	X
50.762	350	X
50.802	50	X
50.903	50	X
50.946	10	X
51.039	10	X
51.362	350	X
51.400	1	X
51.454	1	X
51.979	300g	X
52.299	12	XI
52.446	15	XI
52.966	10g	IX
53.098	10g	IX
53.237	60g	IX
53.267	60g	IX
53.376	10g	IX
53.412	10g	IX
53.424	10	IX
53.488	1	IX
53.554	10	IX
53.785	10	VIII
53.800	10	VIII
53.823	10	VIII
54.115	220	X
54.217	5	XI
54.217	200g	VIII
54.258	200g	VIII
54.388	6	XI
55.227	150	X
55.272	500	X
55.376	750	X
55.622	1	IX
55.667	10	IX
55.731	50	X
56.151	50g	IX
56.304	70g	IX
56.590	75	X
56.650	10	X
56.696	75	X
56.762	10	X
56.802	200	X
56.899	100g	IX
56.945	250g	IX
56.945	250	X
56.964	150	X
57.024	250	X
57.072	10	X
57.116	75	X
57.368	350	X
57.553	10	VIII
57.624	10	VIII
57.663	10	X
58.060	10g	IX
58.112	50g	IX
58.222	100g	IX
58.276	1g	IX
58.750	1g	VII
58.808	1	X
58.858	100	X
58.987	150	X
59.107	300	X
59.298	10	X
59.381	10	IX
59.761	300	IX
59.827	10	VII
59.911	10	VII
60.052	50	X
60.162	10	IX
60.197	50	IX
60.222	10	IX
60.262	10	IX
60.312	50	IX
60.347	100	IX
60.504	150	IX
60.549	200	IX
60.588	300	IX
60.632	205	X
60.645	10	IX
60.700	10	X
60.896	185	X
60.896	300g	IX
61.069	600g	IX
61.647	10	IX
61.694	150	VIII
62.016	100	VIII
62.070	50	IX
62.292	12g	VII
62.296	200	IX
62.327	250	IX
62.369	150	IX
62.474	8g	VII
62.474	100	IX
62.587	100	IX
62.916	150	IX
63.005	65	VII
63.025	500	IX
63.056	65	VII
63.134	200	X
63.203	10	VIII
63.509	500	IX
63.632	300	IX
63.714	100	VIII
63.933	10g	VIII
63.965	150g	VIII
64.004	200g	VIII
64.086	10g	VIII
64.269	10	X
64.325	8	VII
64.358	25	VII
64.481	1	VII
64.516	1	VII
64.625	50	IX
64.698	12	VII
64.815	8g	VII
64.816	9	VII
64.885	150	IX
64.904	100	IX
65.020	12	VII
65.032	175	X
65.128	10	VIII
65.298	10	VIII
65.381	50g	VIII
65.494	50g	VIII
65.821	50	X
65.862	18	VII
65.883	50	VII
66.038	50	IX
66.092	50	IX
66.142	120	IX
66.239	150bl	IX
66.275	50	IX
66.321	60	VIII
66.321	60	IX
66.363	10	VIII
66.409	27	VII
66.624	10g	IX
66.704	150	VIII
66.731	200	VIII
66.771	350	VIII
66.836	100g	IX
67.044	10g	VIII
67.096	100g	VIII

Finding List for Al IV through Al XIII — Continued

Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum
67.121	100g	VIII	75.281	215g	VII	79.455	120	VIII	88.325	100g	VI
67.166	10g	VIII	75.313	250g	VII	79.557	10	VI	88.369	750g	VI
67.244	150g	VIII	75.367	227g	VII	79.637	64	VII	88.425	100g	V
67.288	500g	VIII	75.397	70	VIII	79.692	215	VII	88.462	250g	VI
67.360	250g	VIII	75.488	200	VIII	79.928	390	VII	88.539	400g,bl	V
67.408	500g	VIII	75.544	227g	VII	79.960	390	VII	88.539	bl	VI
67.437	50g	VIII	75.577	150	VIII	79.972	300	VII	88.636	100g	V
67.464	600g	VIII	[75.5880]		XIII	80.320	10	VIII	88.687	100	VI
67.529	10g	VIII	[75.5949]		XIII	80.483	10	VIII	88.688	200g,bl	V
67.565	150	VIII	75.623	100g	VIII	80.58	g	IV	88.817	50g	V
67.828	10	IX	[75.6333]		XIII	80.704	100	VIII	[88.86]		XII
67.946	500	VIII	75.734	50g	VIII	80.770	70	VI	[88.87]		XII
68.375	750	VIII	[75.7533]		XIII	81.176	50	VII	[88.91]		XII
68.531	100	IX	[75.7536]		XIII	81.738	50	VI	88.945	1g	V
68.534	60	VII	75.778	250g	VIII	81.741	262	VII	[88.97]		XII
68.626	64	VII	[75.8063]		XIII	81.774	205	VII	90.196	1000	VI
68.637	50	IX	75.808	100	VII	81.794	365	VII	90.547	515	VII
68.675	30	VII	75.850	195	VII	81.809	380	VII	90.596	185	VII
68.681	10	IX	75.876	195	VII	82.082	70g	VI	90.627	185	VII
68.783	10	IX	75.894	100g	VIII	82.267	50g	VI	90.630	250g,bl	V
68.825	50	VIII	75.903	262	VII	82.338	10g	VI	90.646	100g	V
68.825	50	IX	75.926	185	VII	83.335	10	VIII	90.701	200g	V
68.904	10	IX	75.946		VII	83.465	50	VIII	90.772	195	VII
68.958	50	IX	75.985	50g	VIII	83.635	10	VIII	90.856	600	VI
69.135	215	IX	76.009	205	VII	83.833	512	VII	90.914	200g	V
69.258	50	IX	76.022	157	VII	84.005	475	VII	90.982	50g	V
69.420	50	VIII	76.090	125	VII	84.095	422	VII	91.078	10g	V
69.502	100	VIII	76.226	205	VII	84.38	g	IV	91.332	500	VI
69.611	200	VIII	76.262	195	VII	84.48	g	IV	91.487	50	VIII
69.716	100	IX	76.344	157	VII	85.189	10g	VI	91.750	50g	V
69.773	150	VIII	76.366	140	VII	85.422	100g	VI	92.039	10g	V
69.850	50	IX	76.386	300	VII	85.518	1000g	VI	92.626	750g	VI
70.090	100	IX	76.400	215	VII	85.567	200g	VI	92.638	200g	VI
70.161	300	VIII	76.402	610g	VI	85.623	300g	VI	92.875	500g	VI
70.323	200	VIII	76.422	288	VII	85.662	50g	V	92.970	250g	VI
70.727	250	VIII	76.440	215	VII	85.725	300g	VI	93.275	420	VII
71.238	135	VIII	76.543	215	VII	85.767	400g	VI	93.298	550	VII
71.274	125	VIII	76.582	225	VII	85.804	350g	V	93.517	420	VII
71.625	70	VIII	76.618	200	VI	85.806	350g	VI	93.535	343	VII
72.223	200	VIII	76.697	200	VI	85.817	350g	VI	93.654	20g	V
72.282	195g	VII	76.794	200	VI	85.867	100g	VI	93.755	350g	V
72.324	200	VIII	76.853	200	VIII	85.922	10g,bl	V	93.855	200g	V
72.401	150	VIII	76.953	50	VI	86.018	150g	VI	93.880	70g	V
72.926	100g	VI	77.052	50	VI	86.068	150g	VI	93.955	300g	V
73.076	100g	VI	77.315	10	IX	86.094	150g	VI	93.981	100g	V
73.451	1	IX	77.381	150	IX	86.148	200g	VI	94.089	70g	V
73.625	1	IX	77.605	300	VIII	86.427	100	VIII	94.117	120g	V
73.703	150	VIII	77.778	91	VII	86.666	118	VII	94.160	100g	V
73.733	100	VIII	77.809	104	VII	86.685	166	VII	94.187	100g	V
73.879	200	VIII	77.906	250	VII	86.884	475g	VII	94.321	10g	V
74.016	120	VIII	77.945	500g	VI	87.020	100g	V	94.394	10g	V
74.099	74	VII	77.945	166	VII	87.058	456g	VII	95.433	100	VI
74.259	10g	VI	78.112	100g	VI	87.165	422g	VII	95.56	g	IV
74.321	50g	VII	78.178	50g	VI	87.279	50g	V	95.68	g	IV
74.346	50g	VI	78.329	345	VII	87.331	400g	VI	95.835	30g	V
74.444	300g	VI	78.343	288	VII	87.540	350g	VI	95.975	440	VII
74.504	50g	VI	78.351	1000	VIII	87.587	500g	VI	96.150	20g	V
74.592	150g	VI	78.365	262	VII	87.625	100g	VI	96.207	375	VII
74.656	250g	VI	78.459	70g	VI	87.651	650g	VI	96.327	227	VII
74.785	50	IX	78.508	150	VIII	87.776	250g	VI	96.440	10	VI
74.813	50g	VI	78.628	10g	VI	87.796	250g	VI	96.673	50	VI
74.841	200	VIII	78.712	10	VI	87.863	350g	VI	99.200	20g	V
74.892	100g	VI	78.79	g	IV	87.883	250g	VI	99.277	10g	V
74.965	150	VIII	78.836	100	VIII	88.027	515	VII	99.290	100g	V
75.058	50	VIII	79.022	314	VII	88.163	1000g	VI	99.425	40g	V
75.164	100	VI	79.204	300	VII	88.269	750	VI	99.541	30g	V

Finding List for Al IV through Al XIII — Continued

Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum
99.614	80g	V	[110.8824]		XIII	[239.600]		XIII	352.145	75g	VII
99.774	10g	V	111.196	100g	IV	240.770	200	VII	353.769	140g	VII
100.616	600g	VI	111.589	150g	IV	243.766	600	VI	356.880	20g	VII
100.638	100g	VI	111.781	50g	IV	247.401	10g	VIII	381.15	g	VIII
100.893	200g	VI	113.140	50	VI	248.456	55g	VIII	381.674	55	VII
100.922	200g	VI	113.140	50	VIII	250.139	100g	VIII	383.70	g	VIII
101.027	150g	VI	113.318	50	VI	251.347	10	VIII	383.785	50g	VIII
103.062	10	VI	113.441	150	VI	253.0c		VIII	384.06		IX
103.8		XI	113.453	60bl	VI	254.7c		VIII	384.95	g	IX
103.805	300g	V	113.629	50	VI	259.036	262	VII	386.03	95	VII
103.882	400g	V	113.759	50	VI	259.207	345	VII	387.51	125	VII
103.938	300	VI	114.313	10g	IV	259.6c		VIII	387.73c		VIII
103.992	150g	V	114.737	50g	IV	261.044	330	VII	387.82c		VIII
104.046	1000g	VI	116.464	250g	IV	261.219	495	VII	387.970	100g	VIII
104.072	250g	V	116.921	150g	IV	275.343	300	VI	392.00	45	VII
104.122	200g	V	117.377	10g	IV	278.694	1000g	V	392.418	80g	IX
104.181	250g	V	118.497	250g	V	278.982	510	VII	394.83		X
104.344	800g	VI	118.983	200g	V	279.187	440	VII	395.44		IX
104.362	200g	V	[123.61]		XII	280.114	175g	IX	395.44		X
104.447	100g	V	[123.71]		XII	280.745	100	VII	396.05		IX
104.464	400g	VI	[123.73]		XII	280.994	150	VII	397.85		X
104.496	150g	V	124.030	400g	IV	[281.16]		XII	399.57		VIII
104.89	1g,d	IV	124.550	300g	IV	281.394	900g	V	400.46		X
105.26	2g,d	IV	125.529	900g	V	282.407	240g	IX	401.183	10	X
105.35	3g	IV	126.068	800g	V	282.660	315	VII	403.60		X
105.7		XI	[126.93]		XII	284.015	345g	IX	406.39		X
105.72	4g	IV	[127.10]		XII	285.467	50	VIII	421.46	5	VI
106.01	3g	IV	[127.16]		XII	285.56c		VIII	432.03		IX
106.38	5g	IV	[127.37]		XII	285.81	360	VII	432.73		IX
106.99	g	IV	129.730	700g	IV	285.959	105	VIII	437.46		IX
107.37	g	IV	[129.92]		XII	286.364	215g	IX	438.18		IX
107.622	700	VI	[129.92]		XII	286.61		VIII	456.08	15	V
107.711	200g	V	[130.02]		XII	287.083	165	VIII	456.73	8	V
107.948	600g	V	[130.15]		XII	289.07		VIII	457.00	10	V
108.005	150g	V	130.39	g,bl	IV	289.21c		VIII	463.51	10	V
108.059	300g	V	130.411	800g	V	289.645	58	VIII	466.24	8	V
108.113	300g	V	[130.82]		XII	299.2c		VIII	469.24	20	V
108.316	100g	V	130.847	1000g	V	300.560	125g	IX	471.34	5	V
108.388	150g	V	131.002	900g	V	305.055	165g	IX	471.74	5	V
108.406	150g	V	131.438	900g	V	306.91		IX	474.75	8	V
108.445	50g	V	131.647	150g	IV	307.249	350g	VI	475.63	8	V
108.462	200g	V	132.407	1g	V	307.33		IX	476.13	5	IV
108.526	50g	IV	132.626	500g	V	308.563	300g	VI	476.27	20	IV
108.530	20g	V	133.010	200g	V	309.023	420	VII	477.60	5	IV
108.617	50g	V	133.233	50g	V	309.072	475	VII	477.73	10	IV
108.708	200g	V	135.219	50	V	309.121	375	VII	478.26	30	IV
108.849	30g	V	135.617	100	V	309.597	400g	VI	479.02	10bl	V
108.913	50g	IV	141.55		XI	309.851	300g	VI	479.30	5	IV
108.941	10g,d	V	141.71		XI	310.907	300g	VI	479.76	20	IV
109.021	g	IV	150.30		XI	312.237	300g	VI	480.11		VIII
109.024	100g	V	150.62		XI	316.793	90	IX	481.01	30	IV
109.284	350	VI	154.60		XI	318.537	120	IX	481.29	10	IV
109.516	1000g	VI	154.69		XI	321.027	160	IX	482.08	100	IV
109.630	2g	V	160.074	800g	IV	323.52	g	VIII	482.48	10	IV
109.675	5g	V	161.688	700g	IV	325.31	g	VIII	483.03		VIII
109.730	1g	V	177.80		X	328.200	10g	VIII	483.55	20	IV
109.844	600g	VI	179.003	5	V	328.696	100	VI	485.28	40	IV
109.976	200g	VI	189.977	2	V	329.551	40	VIII	488.36	100	IV
110.045	5g	V	190.569	10	V	331.03		VIII	490.44		VIII
110.13	1g	IV	221.535	50g	VI	332.78	20g	X	490.73	20	IV
[110.4550]		XIII	[238.704]		XIII	334.51		VIII	490.88	40	IV
[110.4695]		XIII	239.030	100	VII	340.23		VIII	492.31	20	IV
110.54	2g	IV	[239.327]		XIII	341.37c		X	492.78	25	IV
[110.6302]		XIII	[239.328]		XIII	343.290	125	VII	493.18		VIII
[110.7822]		XIII	[239.513]		XIII	343.641	160	VII	496.66	10	IV
[110.7827]		XIII	[239.514]		XIII	345.66c		X	497.47	15	IV

Finding List for Al IV through Al XIII — Continued

Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum
1069.437	600	IV	1173.47	200	V	1329.15	200	VI	1558.92	150	V
1071.241	100	IV	1174.967*c*	*m*	IV	1330.06	400	V	1559.03	500	IV
1073.02	200	V	1179.666	20	IV	1331.19	500	VI	1564.164	700	IV
1075.28	10	V	1179.86	20	V	1337.898	400	IV	1569.25	50	V
1076.38*c*	*m*	VI	1183.62	120	V	1340.52	10	V	1572.54	100	IV
1076.73	30	V	1186.18	100	V	1350.518	400	V	1577.90	300	V
1077.35	40	V	1188.67	15	V	1352.87*c*	*m*	V	1579.38	10	V
1077.66	2	VI	1189.711	50	IV	1353.745	150	IV	1582.040	900	IV
1078.17	40*bl*	VI	1191.20	8	V	1353.745	*bl*	V	1584.460	800	IV
1079.41	30	V	1191.907	200	IV	1358.79	500	VI	1589.275	400	IV
1085.331	5	IV	1192.212	150	IV	1359.64	150	V	1589.87	350	V
1085.92	70	V	1193.76	50	V	1359.96	100*bl*	VI	1592.62	40	V
1087.65	10	VI	1194.10	10	V	1360.298	100	IV	1593.54	20	V
1088.52	100	V	1195.37	200	V	1363.351	400	V	1595.46	20	V
1088.67	500	V	1198.500	400	IV	1369.20	600	V	1596.95	60	V
1090.14	300	V	1200.56	20	V	1373.70	300	V	1602.03	20*d*	V
1093.22	8	V	1202.00	10	V	1375.79	100	V	1602.77	300	IV
1094.75	10	V	1204.722	1	IV	1376.618	500	IV	1603.36*c*	M1	VII
1098.718	200	IV	1208.401	10	IV	1388.789	500	IV	1604.80	M1	VII
1099.461	300	IV	1211.724	40	IV	1392.33	40	IV	1606.646	400	IV
1100.60	10	V	1213.48	50	V	1393.42	60	IV	1607.31	1	IV
1101.34	20	IV	1216.723	300	IV	1402.021	100	V	1617.81	400	IV
1102.417	200	IV	1219.171	300	IV	1402.776*c*	*m*	IV	1617.93	200	IV
1103.85		V	1220.546	400	IV	1404.751	300	IV	1621.36	10	V
1104.285	70	IV	1225.236	10	IV	1409.490	100	IV	1621.68	350	IV
1104.617	20	IV	1228.310	300	IV	1409.98	2	VI	1627.536	600	IV
1105.402	50	IV	1229.908	40	IV	1412.772	100	V	1628.58	50	IV
1105.738	400	IV	1237.187	900	IV	1416.05	20	VI	1636.822	500	IV
1106.20	20	V	1237.744	10	IV	1417.558	100	IV	1639.055	800	IV
1106.41	70	V	1240.206	600	IV	1422.176	200	IV	1641.05	300	IV
1107.55	20	V	1240.861	700	IV	1422.58	200	VI	1641.20	200	IV
1111.48	100	V	1248.790	700	IV	1424.995	250	IV	1641.55	50	IV
1112.51	20	V	1251.235	150	IV	1425.64	80	V	1644.47	200	IV
1115.04	10	V	1253.11	3	V	1430.52	10	VI	1647.79	1	IV
1117.93	50	V	1253.76	2	V	1431.935	600	IV	1672.722	20	IV
1118.824	600	IV	1256.083	40	IV	1431.96*c*	*m*	V	1712.43	200	IV
1119.39	30	V	1257.624	900	IV	1432.51	10	VI	1716.28	5	IV
1119.94	10	V	1262.544	300	IV	1432.97	10	IV	1754.120	20	IV
1121.79	20	V	1264.181	800	IV	1441.825	700	IV	1755.431	100	IV
1122.66	50	V	1264.67	10	V	1442.17	400	VI	1762.424	200	IV
1122.88	200	V	1269.209	20	IV	1445.87	400	V	1818.563	1000	IV
1125.613	500	IV	1272.763	1000	IV	1447.512	800	IV	1881.159	700	IV
1126.001	5	IV	1275.731	5	IV	1454.65	30	V	1894.48	50	IV
1128.62	2	V	1278.265	50	IV	1455.265	300	V	1939.022	300	IV
1129.43	80	V	1280.01	8	V	1457.956	600	IV			
1129.62	60	V	1283.484	40	IV	1460.168	250	IV	Air		
1130.00	2	V	1287.70	500	V	1465.392	10	V			
1131.84	10	V	1288.23	100	V	1466.24	15	IV	2016.19	30	IV
1136.821	400	IV	1290.486	20	IV	1470.024	30	IV	2128.45	40	IV
1139.25	1	V	1291.91	30	V	1471.303	40	IV	2130.837	200	IV
1141.39	1	V	1292.44	200	V	1475.64	600	V	2130.92	200*bl*	IV
1142.058	200	IV	1293.51	30	V	1486.05	300	V	2146.25	15	IV
1149.450	200	IV	1301.13	10	V	1486.887	700	IV	2152.29	30	IV
1150.870*c*	*m*	IV	1304.547	30	IV	1494.791	800	IV	2158.32	100	IV
1150.30	300	V	1305.21	1	IV	1507.442	300	IV	2161.12	5	IV
1150.67	10	V	1306.432	200	IV	1508.37	700	V	2162.24	15	IV
1152.89	30	V	1307.762	60	IV	1511.88	100	IV	2176.84	5	IV
1154.730	250	IV	1308.16	5	V	1513.20	10	IV	2184.05	10	IV
1154.90	10	V	1312.135	20	IV	1519.07	400	IV	2209.14	15	IV
1156.263	150	IV	1312.43	10	V	1526.14	1000	V	2211.21	3	IV
1160.32	1	IV	1319.57	1	IV	1532.16	300	IV	2212.21	2	IV
1161.885	300	IV	1320.57	400	VI	1537.540	800	IV	2221.*c*	M1	VIII
1165.42	350	V	1321.59	900	VI	1539.124	500	V	2229.13	30	IV
1167.39	150	IV	1324.92	300	VI	1550.192	500	IV	2240.47	50*bl*	IV
1168.48	250	V	[1327.65]		XII	1556.88	1	IV	2240.563	300	IV
1171.59	5	IV	1327.68	800	VI	1557.254	1000	IV	2257.187	100	IV

Finding List for Al IV through Al XIII – Continued

Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum	Wavelength (Å)	Int.	Spectrum
2260.838	60	IV	2515.48	100	IV	3267.213	500	IV	4190.41	10	IV
2272.348	20	IV	2515.87	400	IV	3285.13	600	IV	4378.58	10	IV
2272.66	50	IV	2516.20	80*bl*	IV	3297.943	150	IV	4411.38	5	IV
2283.027	40	IV	2517.29	200	IV	3316.546	200	IV	4436.15	7	IV
2287.01	2	IV	2520.68	10	IV	3332.962	300	IV	4468.85	20	IV
2288.29	2	IV	2522.28	5	IV	3344.46	400	IV	4502.25	30	IV
2294.524	50	IV	2527.27	150*bl*	IV	3423.125	350	IV	4503.74	40	IV
2301.04	3	IV	2527.50	200	IV	3452.159	50	IV	4549.27	5	IV
2324.13	20	IV	2529.63	6	IV	3473.536	500	IV	4620.35	15	IV
2363.*c*	M1	VIII	2529.90	10	IV	3492.226	900	IV	4626.06	5	IV
2368.272	40	IV	2604.71	10	V	3508.457	800	IV	[9896.6]		XIII
2371.027	50	IV	2624.54	5	IV	3511.284	500	IV			
2383.355	5	IV	2868.98	5	IV	3517.556	700	IV	**Wavenumber (cm^{-1})**	**Int.**	**Spectrum**
2479.75	20	V	2961.29	300	IV	3519.638	5	IV			
2481.60	5	V	3070.7*c*	M1	VII	3527.034	400	IV			
2495.47	80	IV	3076.0*c*	M1	VII	3541.076	500	IV	4902	M1	IX
2497.14	200	IV	3096.0*c*	M1	VII	3546.770	10	IV	3473	M1	V
2501.37	5	IV	3208.20	500	IV	3638.86	50	IV	2731	M1	VI
2501.60	3*bl*	IV	3214.13	10	IV	3662.01	1	IV	2687	M1	VIII
2507.76	300	IV	3241.343	20	IV	3662.88	2	IV	1710*c*	M1	VIII
2508.01	300	IV	3246.143	100	IV	3725.92	300	IV	[409.1]		XIII
2514.30	200	IV	3253.426	15	IV	3805.81	10	IV			