

4. CHEMICAL AND PHYSICAL INFORMATION

4.1 CHEMICAL IDENTITY

Table 4-1 lists the common synonyms, trade names, and other pertinent identification information for cadmium and its most important compounds.

4.2 PHYSICAL AND CHEMICAL PROPERTIES

Table 4-2 lists important physical and chemical properties of cadmium and its most important compounds.

4. CHEMICAL AND PHYSICAL INFORMATION

Table 4-1. Chemical Identity of Cadmium and Compounds^a

Characteristic	Information		
	Cadmium	Cadmium carbonate	Cadmium chloride
Chemical name	Cadmium	Cadmium carbonate	Cadmium chloride
Synonym(s)	Colloidal cadmium	Otavite ^b ; cadmium monocarbonate; carbonic acid; cadmium salt	Caddy ^b ; Vi-Cad ^b ; cadmium dichloride; dichlorocadmium
Registered trade name(s)	No data	No data	No data
Chemical formula	Cd ^b	CdCO ₃ ^b	CdCl ₂ ^b
Chemical structure	Cd ^b	CdCO ₃ ^b	CdCl ₂ ^b
Identification numbers:			
CAS registry	7440-43-9 ^b	513-78-0 ^b	10108-64-2
NIOSH RTECS	No data	No data	No data
EPA hazardous waste	D006	D006	D006
OHM/TADS	No data	No data	No data
DOT/UN/NA/IMDG shipping	No data	No data	NA2570/IMCO 6.1
HSDB	282	1612	278
NCI	No data	No data	No data

4. CHEMICAL AND PHYSICAL INFORMATION

Table 4-1. Chemical Identity of Cadmium and Compounds^a

Characteristic	Information		
Chemical name	Cadmium oxide	Cadmium sulfate	Cadmium sulfide
Synonym(s)	Aska-Rid ^b ; cadmium fume; cadmium monoxide	Cadmium sulphate; sulfuric acid; cadmium (2+) salt	Cadmium monosulfide; cadmium yellow; cadmium orange; cadmopur yellow; greenockite ^b ; capsebon ^b
Registered trade name(s)	No data	No data	No data
Chemical formula	CdO ^b	CdSO ₄ ^b	CdS ^b
Chemical structure	CdO ^b	CdSO ₄ ^b	CdS ^b
Identification numbers:			
CAS registry	1306-19-0 ^b	10124-36-4 ^b	1306-23-6 ^b
NIOSH RTECS	No data	No data	No data
EPA hazardous waste	D006	D006	D006
OHM/TADS	No data	No data	No data
DOT/UN/NA/IMDG shipping	UN2570/IMCO 6.1	No data	No data
HSDB	1613	274	1614
NCI	No data	No data	No data

^aAll information obtained from HSDB 2008 except where noted

^bO'Neil et al. 2006

CAS = Chemical Abstracts Service; DOT/UN/NA/IMDG = Department of Transportation/United Nations/North America/International Maritime Dangerous Goods Code; EPA = Environmental Protection Agency; HSDB = Hazardous Substances Data Bank; NCI = National Cancer Institute; NIOSH = National Institute for Occupational Safety and Health; OHM/TADS = Oil and Hazardous Materials/Technical Assistance Data System; RTECS = Registry of Toxic Effects of Chemical Substances

4. CHEMICAL AND PHYSICAL INFORMATION

Table 4-2. Physical and Chemical Properties of Cadmium and Compounds^a

Property	Cadmium	Cadmium carbonate
Molecular weight	112.41 ^b	172.42 ^b
Color	Silver-white ^b	White ^c
Physical state	Lustrous metal ^b	Powder or rhombohedral leaflets ^b
Melting point	321 °C ^b	Decomposes at 357 °C
Boiling point	765 °C ^b	No data
Density at 20 °C	8.65 g/cm ³ at 25 °C ^b	4.58 g/cm ^{3f}
Odor	Odorless	No data
Odor threshold:		
Water	No data	No data
Air	No data	No data
Solubility:		
Water at 20 °C	Insoluble ^b	Insoluble ^f
Organic solvents	Acids, NH ₄ NO ₃ [†]	Acids, especially HNO ₃ , concentrated NH ₄ solution ^c
Partition coefficients:		
Log K _{ow}	No data	No data
Log K _{oc}	No data	No data
Vapor pressure	7.5x10 ⁻³ mmHg at 257 °C	No data
Henry's law constant at 25 °C	No data	No data
Autoignition temperature	250 °C	No data
Flashpoint	No data	No data
Flammability limits	No data	No data
Conversion factors	No data	No data
Explosive limits	No data	No data

4. CHEMICAL AND PHYSICAL INFORMATION

Table 4-2. Physical and Chemical Properties of Cadmium and Compounds^a

Property	Cadmium chloride	Cadmium oxide
Molecular weight	183.32	128.41 ^b
Color	White ^c	Dark brown ^b
Physical state	Rhombohedral crystals ^b	Infusible powder or cubic crystals ^b
Melting point	568 °C ^b	Decomposes at 950 °C
Boiling point	960 °C ^b	Decomposes at 950 °C
Density at 20 °C	4.047g/cm ³ at 25 °C ^e	Crystals 8.15 g/cm ³ ; amorphous powder 6.95 g/cm ^{3c}
Odor	Odorless ^c	Odorless
Odor threshold:		
Water	No data	No data
Air	No data	No data
Solubility:		
Water at 20 °C	Soluble ^b	Insoluble ^b
Organic solvents	Acetone, slightly soluble in MEOH and ETOH ^b	Dilute acid, slowly soluble in NH ₄ salts ^b
Partition coefficients:		
Log K _{ow}	No data	No data
Log K _{oc}	No data	No data
Vapor pressure	10 mmHg at 656 °C ^e , 40 mmHg at 736 °C ^d , 760 mmHg at 967 °C ^d	1 mmHg at 1,000 °C ^e ; 10 mm Hg at 1149 °C; 40 mm Hg at 1257 °C
Henry's law constant at 25 °C	No data	No data
Autoignition temperature	No data	No data
Flashpoint	No data	No data
Flammability limits	No data	No data
Conversion factors	No data	No data
Explosive limits	No data	No data

4. CHEMICAL AND PHYSICAL INFORMATION

Table 4-2. Physical and Chemical Properties of Cadmium and Compounds^a

Property	Cadmium sulfate	Cadmium sulfide
Molecular weight	208.47 ^b	144.48 ^b
Color	Colorless ^c	Light yellow or orange ^b ; brown ^c
Physical state	Monoclinic crystals ^b	Cubic or hexagonal structure ^b
Melting point	1,000 °C ^c	1,750 °C ^c
Boiling point	No data	Sublimes in N ₂ at 980 °C ^c
Density at 20 °C	4.69 g/cm ^{3b}	4.82 g/cm ³ , hexagonal structure ^b , 4.5 g/cm ³ , cubic structure ^b
Odor	Odorless	No data
Odor threshold:		
Water	No data	No data
Air	No data	No data
Solubility:		
Water at 20 °C	Soluble ^c	Soluble at 1.3 mg/L at 18 °C ^b
Organic solvents	Insoluble in alcohol ^c , acetone, ammonia ^f	Concentrated or warm dilute mineral acids ^b
Partition coefficients:		
Log K _{ow}	No data	No data
Log K _{oc}	No data	No data
Vapor pressure at 20 °C	No data	No data
Henry's law constant at 25 °C	No data	No data
Autoignition temperature	No data	No data
Flashpoint	No data	No data
Flammability limits	No data	No data
Conversion factors	No data	No data
Explosive limits	No data	No data

^aAll information from HSDB 2008, except where noted.

^bO'Neil et al. 2006

^cSax and Lewis 2001

^dFarnsworth 1980

^eSax and Lewis 2000

^fLide 2005