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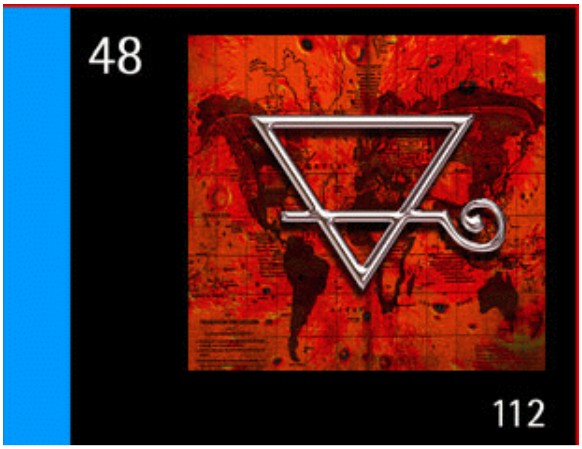
CADMIUM - Cd

Atomic Number: 48 **Atomic Weight: 112.41**



General Information

Discovery: Cadmium was discovered by F. Stromeyer in 1817 in Gottingen, Germany, from an impurity in zinc carbonate.

Origin : The name is derived from the Latin 'cadmia', the name for the mineral calamine.

Appearance: Cadmium is a soft, bluish-white metal which is easily cut with a knife.

Description : A silvery metal produced as a by-product of zinc refining. Cadmium is used extensively in electroplating, which accounts for about 60% of its use. It is also used in many types of solder, for standard e.m.f. cells, for nickel-cadmium batteries and as a barrier to control atomic fission. It is a component of some of the lowest melting alloys, alloys with low coefficients of friction and alloys with great resistance to fatigue. Cadmium compounds are used in blue and green phosphors in color television sets. Cadmium forms a number of compounds, the sulphide being used as an artist's pigment as it is bright yellow. Cadmium accumulates in the body; although a person's daily intake may be as little as 0.05 milligram's, he or she will have stored, on average about 50 milligram's. Cadmium is a poison and is known to cause birth defects and cancer. As a result, there are moves to limit its use.
Cadmium tarnishes in air, is soluble in acids but not in alkalis.

Source: The only mineral containing significant quantities of cadmium are greenockite, although some is present in sphalerite. Almost all commercially produced cadmium is obtained as a by-product in the treatment of zinc, copper and lead ores.

Biological Role: Cadmium is toxic, carcinogenic and teratogenic. In the past, failure to recognize the toxicity of this element caused workers to be exposed to danger in the form of solder fumes and cadmium plating baths.

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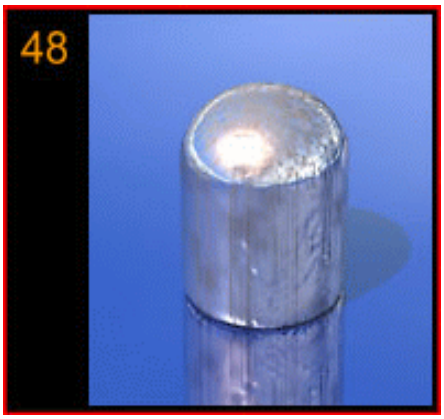
Physical Information

Atomic Number	48
Relative Atomic Mass (^{12}C=12.000)	112.41
Melting Point/^{0}F	610
Boiling Point/^{0}F	1403
Density	8.64
Weight Lb/in^3	0.3125
Ground State Electron Configuration	$[Kr]4d^{10}5s^2$
Electron Affinity(M-M-)/kJ mol^{-1}	-26



Key Isotopes

nuclide	^{112}Cd	^{113}Cd	^{114}Cd	^{115}Cd	^{116}Cd
atomic mass	111.9	112.9	113.9		115.9
natural abundance	0%	24.13%	12.22%	28.72%	7.47%
half-life	53.5h	stable	stable	stable	stable

Ionization Energies/kJ mol^{-1}

$M - M^+$	867.6
$M^+ - M^{2+}$	1631
$M^{2+} - M^{3+}$	3616
$M^{3+} - M^{4+}$	5300
$M^{4+} - M^{5+}$	7000
$M^{5+} - M^{6+}$	9100
$M^{6+} - M^{7+}$	11100
$M^{7+} - M^{8+}$	14100
$M^{8+} - M^{9+}$	16400
$M^{9+} - M^{10+}$	18800

Other Information

Enthalpy of Fusion/kJ mol^{-1}	6.11
Enthalpy of Vaporization/kJ mol^{-1}	100

Oxidation States

Main	Cd^{III}
Others	Cd^{I}

Covalent Bonds /kJ mol^{-1}

not applicable