

Stable isotopes of cadmium available from ISOFLEX

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Enrichment Level	Chemical Form
Cd-106	48	58	105.90646	1.25%	81.00%-99.00%	Metal
Cd-106	48	58	105.90646	1.25%	81.00%-99.00%	Oxide
Cd-108	48	60	107.90418	0.89%	66.00%-99.00%	Metal
Cd-108	48	60	107.90418	0.89%	66.00%-99.00%	Oxide
Cd-110	48	62	109.903006	12.49%	95.00%-99.00%	Metal
Cd-110	48	62	109.903006	12.49%	95.00%-99.00%	Oxide
Cd-111	48	63	110.904182	12.80%	95.00%-97.50%	Metal
Cd-111	48	63	110.904182	12.80%	95.00%-97.50%	Oxide
Cd-112	48	64	111.902758	24.13%	88.00%-98.00%	Metal
Cd-112	48	64	111.902758	24.13%	88.00%-98.00%	Oxide
Cd-113	48	65	112.904402	12.22%	93.00%-96.00%	Metal
Cd-113	48	65	112.904402	12.22%	93.00%-96.00%	Oxide
Cd-114	48	66	113.903359	28.73%	99.00%	Metal
Cd-114	48	66	113.903359	28.73%	99.00%	Oxide
Cd-116	48	68	115.904756	7.49%	99.00%	Metal
Cd-116	48	68	115.904756	7.49%	99.00%	Oxide



Cadmium was discovered in 1817 by Friedrich Strohmeyer. Its name originates with the Latin word *cadmia* (meaning "calamine" or "zinc carbonate") as well as the Greek word *kadmeia*, with the same meaning.

Cadmium is a bluish-white lustrous soft metal with a close-packed hexagonal system. It is insoluble in water. The metal is slowly oxidized in moist air at ordinary temperatures, forming a protective coating of cadmium oxide. The element combines with many nonmetals upon heating, forming its binary salts. It combines with halogens when heated, forming the corresponding halides. The metal is attacked by mineral acids. Reactions with hot dilute nitric acid give various oxides of nitrogen and hydrogen. Aqueous solutions of alkali hydroxides do not attack cadmium. Cadmium replaces elements that are less electropositive in the activity series from their salt solutions. It can displace a number of metals that are less active, such as copper, lead, silver, mercury, tin and antimony from their aqueous salt solutions. It is used for electroplating, to impart a protective coating on iron and steel. It provides resistance against caustic alkalis.

A major application is in the nickel-cadmium storage battery, where it enhances long service life and a wide operating range. Cadmium alloys also find wide applications in bearing metals, solders, fusible metals, electrical conductors, power transmission wires and jewelry. Cadmium electrodes are used in photoelectric cells, cadmium vapor lamps and selenium rectifiers. Graphite impregnated with cadmium is used in electrical controller switches, oil-less bearings and busing lines. Cadmium rods are used in nuclear reactors to absorb low-energy neutrons.

Properties of Cadmium

Name	Cadmium
Symbol	Cd
Atomic number	48
Atomic weight	112.41
Standard state	Solid at 298 °K
CAS Registry ID	7440-43-9
Group in periodic table	12
Group name	None
Period in periodic table	5
Block in periodic table	d-block
Color	Silvery gray metallic
Classification	Metallic
Melting point	321.10 °C
Boiling point	765 °C
Vaporization point	767 °C
Thermal conductivity	97 W/(m·K)
Electrical resistivity	6.83 $\mu\Omega\cdot\text{cm}$ at 0 °C
Electronegativity	1.7
Specific heat	230 J/(kg·K)
Heat of vaporization	100 kJ·mol ⁻¹
Heat of fusion	6.30 kJ·mol ⁻¹
Density of liquid	7.996 g/cm ³ at 321.1 °C
Density of solid	8.65 g/cm ³
Electron configuration	[Kr]4d ¹⁰ 5s ²
Ionization potential	8.994 eV
Standard electrode potential	E° = -0.40 V
Oxidation state	+2