

Mercury

Hg

General Information

Discovery

Mercury was known to ancient civilisations, such as the Chinese and Hindus, and has been found in Egyptian tombs of 1500B.C.

Appearance

Mercury is a heavy, silvery, liquid metal.

Source

Mercury occurs very rarely free in nature, but can be found in ores, principally cinnabar. This is mostly found in Spain and Italy, which together produce about 50% of the world's supply of this element. The metal is obtained by heating cinnabar in a current of air and condensing the vapour.

Uses

Mercury easily forms alloys, called amalgams, with other metals such as gold, silver and tin. Its ease in amalgamating with gold is made use of in recovering gold from its ores. It is used in the manufacture of sodium hydroxide and chlorine by electrolysis of brine. The metal is widely used in making advertising signs, mercury switches and other electrical apparatus. It is used in laboratory work for making thermometers, barometers, diffusion pumps and many other instruments. Other uses are in pesticides, dental work, batteries and catalysts. Because of its toxicity, all these uses are being phased out or are under review.

Some mercury salts and organic mercury compounds are still important, including mercurous chloride (calomel), which is used in electrolysis, and mercuric sulfide (vermillion), a high-grade paint pigment.

Biological Role

Mercury has no known biological role. It is a virulent poison, readily absorbed through the respiratory tract, the gastrointestinal tract or through the skin. It is a cumulative poison and dangerous levels are readily attained in air. It is now always handled with the utmost care.

General Information

Mercury is stable with air and water, unreactive to all acids except nitric acid, and all alkalis. It is a rather poor conductor of heat compared with other metals, and a fair conductor of electricity.

Physical Information

Atomic Number	80
Relative Atomic Mass ($^{12}\text{C}=12.000$)	200.59
Melting Point/K	234
Boiling Point/K	629
Density/kg m ⁻³	13546 (293K)
Ground State Electron Configuration	[Xe]4f ¹⁴ 5d ¹⁰ 6s ²
Electron Affinity (M-M ⁻)/kJ mol ⁻¹	+18

Key Isotopes

Nuclide	¹⁹⁶ Hg	¹⁹⁷ Hg	¹⁹⁸ Hg	¹⁹⁹ Hg	²⁰⁰ Hg	²⁰¹ Hg
Atomic mass	195.97		197.97	198.97	199.97	200.97
Natural abundance	0.2%	0%	10.1%	17.0%	23.1%	13.2%
Half-life	stable	65 h	stable	stable	stable	stable
Nuclide	²⁰² Hg	²⁰⁴ Hg				
Atomic mass	201.97	203.97				
Natural abundance	29.6%	6.8%				
Half-life	stable	stable				

Ionisation Energies/kJ mol⁻¹

M - M ⁺	1007
M ⁺ - M ²⁺	1809
M ²⁺ - M ³⁺	3300
M ³⁺ - M ⁴⁺	4400
M ⁴⁺ - M ⁵⁺	5900
M ⁵⁺ - M ⁶⁺	7400
M ⁶⁺ - M ⁷⁺	9100
M ⁷⁺ - M ⁸⁺	11600
M ⁸⁺ - M ⁹⁺	13400
M ⁹⁺ - M ¹⁰⁺	15300

Other Information

Enthalpy of Fusion/kJ mol ⁻¹	2.33
Enthalpy of Vaporisation/kJ mol ⁻¹	59.1
Oxidation States	
Main	Hg ⁺²
Others	Hg ⁺¹