

Holmium

Ho

General Information

Discovery

The spectral absorption bands of holmium were first identified by M. Delafontaine and J.L. Soret in 1878 in Geneva, Switzerland. The element was independently discovered by P.T. Cleve in 1878 in Uppsala, Sweden.

Appearance

Holmium is a silvery metal with a bright lustre.

Source

The principal source of holmium is the mineral monazite, from which it is obtained by ion exchange and solvent extraction. It can also be obtained by reduction of the anhydrous fluoride by calcium metal.

Uses

Holmium can absorb fission-bred neutrons, so is used in nuclear reactors to keep a chain reaction under control. It is little used otherwise.

Biological Role

Holmium has no known biological role, and is non-toxic.

General Information

Holmium is relatively soft and malleable. It is slowly attacked by water and oxygen, and reacts with acid.

Physical Information

Atomic Number	67
Relative Atomic Mass ($^{12}\text{C}=12.000$)	164.93
Melting Point/K	1747
Boiling Point/K	2968
Density/ kg m^{-3}	8795 (298K)
Ground State Electron Configuration	$[\text{Xe}]4f^{11}6s^2$
Electron Affinity (M-M $^-$)/ kJ mol^{-1}	-50

Key Isotopes

Nuclide	^{165}Ho	^{166}Ho
Atomic mass	164.9	
Natural abundance	100%	0%
Half-life	stable	26.9 h

Ionisation Energies/ kJ mol^{-1}

M - M $^+$	580.7
M $^+$ - M $^{2+}$	1139
M $^{2+}$ - M $^{3+}$	2204
M $^{3+}$ - M $^{4+}$	4100
M $^{4+}$ - M $^{5+}$	
M $^{5+}$ - M $^{6+}$	
M $^{6+}$ - M $^{7+}$	
M $^{7+}$ - M $^{8+}$	
M $^{8+}$ - M $^{9+}$	
M $^{9+}$ - M $^{10+}$	

Other Information

Enthalpy of Fusion/ kJ mol^{-1}	17.2
Enthalpy of Vaporisation/ kJ mol^{-1}	303

Oxidation States

Ho $^{+3}$