

Ytterbium

Yb

General Information

Discovery

Ytterbium was discovered by J.C.G. de Marignac in 1878 in Geneva, Switzerland.

Appearance

Ytterbium has a bright, silvery lustre. It is soft, malleable and quite ductile.

Source

In common with many lanthanide elements, ytterbium is found principally in the mineral monazite, from which it can be extracted by ion exchange and solvent extraction.

Uses

Ytterbium is little used outside research.

Biological Role

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

General Information

Ytterbium is slowly oxidised by the air, and reacts with water. It is readily attacked by acids.

Physical Information

Atomic Number	70
Relative Atomic Mass ($^{12}\text{C}=12.000$)	173.04
Melting Point/K	1097
Boiling Point/K	1466
Density/kg m ⁻³	6965 (293K)
Ground State Electron Configuration	[Xe]4f ¹⁴ 6s ²
Electron Affinity (M-M ⁻)/kJ mol ⁻¹	-50

Key Isotopes

Nuclide	¹⁶⁸ Yb	¹⁶⁹ Yb	¹⁷⁰ Yb	¹⁷¹ Yb	¹⁷² Yb	¹⁷³ Yb
Atomic mass	167.9		169.9	170.9	171.9	172.9
Natural abundance	0.14%	0%	3.06%	14.4%	21.9%	16.1%
Half-life	stable	31.8 days	stable	stable	stable	stable
Nuclide	¹⁷⁴ Yb	¹⁷⁵ Yb	¹⁷⁶ Yb			
Atomic mass	173.9		175.9			
Natural abundance	31.8%	0%	12.7%			
Half-life	stable	101 h	stable			

Ionisation Energies/kJ mol⁻¹

M - M ⁺	603.4
M ⁺ - M ²⁺	1176
M ²⁺ - M ³⁺	2415
M ³⁺ - M ⁴⁺	4220
M ⁴⁺ - M ⁵⁺	
M ⁵⁺ - M ⁶⁺	
M ⁶⁺ - M ⁷⁺	
M ⁷⁺ - M ⁸⁺	
M ⁹⁺ - M ¹⁰⁺	

Other Information

Enthalpy of Fusion/kJ mol ⁻¹	9.2
Enthalpy of Vaporisation/kJ mol ⁻¹	159
Oxidation States	
Yb ⁺² , Yb ⁺³	