Terbium *Tb*

General Information

Discovery

Terbium was discovered by C.G. Mosander in 1843 in Stockholm, Sweden.

Appearance

Terbium is a silver-grey metal, malleable, ductile, and soft enough to be cut with a knife.

Source

Terbium can be recovered from the mineral monazite by ion exchange and solvent extraction, and from euxenite, a complex oxide containing 1% or more of terbium. It is usually produced commercially by reducing the anhydrous fluoride or chloride with calcium metal.

Uses

Terbium is used to dope calcium fluoride, calcium tungstate and strontium molybdate, all used in solid-state devices. Terbium salts are used in laser devices, but otherwise this element is not widely used.

Biological Role

Terbium has no known biological role, and has low toxicity.

General Information

Terbium is slowly oxidised by air, and reacts with cold water.

Physical Information

Atomic Number	65
Relative Atomic Mass (^{12}C=12.000)	158.92
Melting Point/K	1629
Boiling Point/K	3396
Density/kg m^{-3}	8229 (293K)
Ground State Electron Configuration	$[Xe]4f^{9}6s^{2}$
Electron Affinity (M-M^{-})/kJ mol^{-1}	50

Key Isotopes

Nuclide	^{159}Tb	^{160}Tb
Atomic mass	158.9	
Natural abundance	100%	0%
Half-life	stable	72.1 days

Ionisation Energies/kJ mol^{-1}

M	- M^{+}	564.6
M^{+}	- M^{2+}	1112
M^{2+}	- M^{3+}	2114
M^{3+}	- M^{4+}	3839

Other Information

Enthalpy of Fusion/kJ mol^{-1}	16.3
Enthalpy of Vaporisation/kJ mol^{-1}	391

Oxidation States

Tb^{III}, Tb^{IV}

Covalent Bonds/kJ mol^{-1}

Not applicable