Lutetium Lu

General Information

Discovery

Lutetium was discovered by G. Urbain in 1907 in Paris, France, and independently by C. James in the same year in New Hampshire, USA.

Appearance

Lutetium is a silvery-white metal, the hardest and densest of the rare earth elements.

Source

In common with many other rare earth elements, the principal source of lutetium is the mineral monazite, from which it is extracted with difficulty by reduction of the anhydrous fluoride by a metal from Group I or II.

Uses

Lutetium has no practical value.

Biological Role

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

General Information

Lutetium is one of the costliest of the rare earth elements. It is relatively stable in air.

Physical Information

Atomic Number	71
Relative Atomic Mass (^{12}C=12.000)	174.97
Melting Point/K	1963
Boiling Point/K	3668
Density/kg m^{-3}	9840 (298K)
Ground State Electron Configuration	$[Xe]4f^{14}5d^{1}6s^{2}$
Electron Affinity (M-M^{-})/kJ mol^{-1}	50

Key Isotopes

Nuclide	^{175}Lu	^{176}Lu	^{177}Lu
Atomic mass	174.9		
Natural abundance	97.39%	2.61%	0%
Half-life	stable	$2.2x10^{10}$ yrs	6.74 days

Ionisation Energies/kJ mol^{-1}

M - M^{+}	523.5
M^{+} - M^{2+}	1340
M^{2+} - M^{3+}	2022
M^{3+} - M^{4+}	4360
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}	19.2
Enthalpy of Vaporisation/kJ mol^{-1}	428

Oxidation States

Lu^{III}

Covalent Bonds/kJ mol^{-1}

Not applicable