

Barium

Ba

General Information

Discovery

Barium was discovered by Sir Humphry Davy in 1808 in London.

Appearance

Barium is a relatively soft, silvery-white metal resembling lead. It oxidises very easily and is therefore stored under petroleum or in an inert gas atmosphere.

Source

Barium occurs only in combination with other elements, chiefly in the ores barytes and witherite. It can be prepared by electrolysis of the chloride, or by heating barium oxide with aluminium.

Uses

Barium is not an extensively used element. The best-known use is in the form of barium sulfate, which can be drunk as a medical cocktail to outline the stomach and intestines for medical examination. The sulfate is also used in paint and in glassmaking.

Barium carbonate has been used as a rat poison. Barium nitrate gives fireworks a green colour.

Biological Role

Barium and all its compounds that are water or acid soluble are toxic.

General Information

Barium is attacked by air, and reacts rapidly with water and alcohol.

Physical Information

Atomic Number	56
Relative Atomic Mass ($^{12}\text{C}=12.000$)	137.33
Melting Point/K	1002
Boiling Point/K	1910
Density/kg m ⁻³	3594 (293K)
Ground State Electron Configuration	[Xe]6s ²
Electron Affinity (M-M ⁻)/kJ mol ⁻¹	+46

Key Isotopes

Nuclide	¹³⁰ Ba	¹³² Ba	¹³³ Ba	¹³⁴ Ba	¹³⁵ Ba	¹³⁶ Ba
Atomic mass	129.9	131.9		133.9	134.9	135.9
Natural abundance	0.106%	0.101%	0%	2.417%	6.592%	7.854%
Half-life	stable	stable	10.53 yrs	stable	stable	stable
Nuclide	¹³⁷ Ba	¹³⁸ Ba	¹⁴⁰ Ba			
Atomic mass	136.9	137.9				
Natural abundance	11.32%	71.7%	0%			
Half-life	stable	stable	12.7 days			

Ionisation Energies/kJ mol⁻¹

M - M ⁺	502.8
M ⁺ - M ²⁺	965.1
M ²⁺ - M ³⁺	3600
M ³⁺ - M ⁴⁺	4700
M ⁴⁺ - M ⁵⁺	6000
M ⁵⁺ - M ⁶⁺	7700
M ⁶⁺ - M ⁷⁺	9000
M ⁷⁺ - M ⁸⁺	10200
M ⁸⁺ - M ⁹⁺	13500
M ⁹⁺ - M ¹⁰⁺	15100

Other Information

Enthalpy of Fusion/kJ mol ⁻¹	7.66
Enthalpy of Vaporisation/kJ mol ⁻¹	150.9
Oxidation States	
Ba ⁺²	