

Lithium

Li

General Information

Discovery

Lithium was discovered by Arfvedson in 1817.

Appearance

Lithium has a silvery appearance but quickly becomes covered by a film of black oxide when exposed to air. It is usually stored immersed in an inert oil.

Source

Lithium does not occur free in nature, but is found combined in small amounts in nearly all igneous rocks and in the waters of many mineral springs. Lepidolite, spodumene, petalite and amblygonite are the more important minerals containing lithium. Large deposits of spodumene are recovered from brines of lakes in California and Nevada, and solid deposits are found in North Carolina. Lithium metal is usually produced electrolytically from the fused chloride.

Uses

Lithium has the highest specific heat of any solid element, and is therefore used in many heat transfer applications. However, it is corrosive and requires special handling. It is used as an alloying agent, in the synthesis of organic compounds, and has nuclear applications. It has a high electrochemical potential so is one of the most widely used battery anode materials. Lithium is also used in special glasses and ceramics.

Lithium chloride is one of the most hygroscopic materials known, and is used in air conditioning and industrial drying systems (as is lithium bromide). Lithium stearate is used as an all-purpose and high-temperature lubricant.

Biological Role

Lithium has no known natural biological role. It is non-toxic, teratogenic, stimulatory and an anti-depressant.

General Information

Lithium reacts with water, but not as vigorously as sodium. It imparts a beautiful crimson colour to a flame, but when the metal burns strongly the flame is a dazzling white.

Physical Information

Atomic Number	3
Relative Atomic Mass ($^{12}\text{C}=12.000$)	6.941
Melting Point/K	453.69
Boiling Point/K	1620
Density/kg m ⁻³	534 (293K)
Ground State Electron Configuration	[He]2s ¹
Electron Affinity (M-M ⁻)/kJ mol ⁻¹	57

Key Isotopes

Nuclide	⁶ Li	⁷ Li
Atomic mass	6.015	7.016
Natural abundance	7.5%	92.5%
Half-life	stable	stable

Ionisation Energies/kJ mol⁻¹

M - M ⁺	513.3
M ⁺ - M ²⁺	7298.0
M ²⁺ - M ³⁺	11814.8

Other Information

Enthalpy of Fusion/kJ mol ⁻¹	4.60
Enthalpy of Vaporisation/kJ mol ⁻¹	147.7

Oxidation States

Main	Li ⁺
Others	Li ⁻¹

Covalent Bonds/kJ mol⁻¹

Not applicable