



## >>Entry Name: Lithium

**CAS Registry Number:** 7439-93-2

**Related CAS Registry Numbers(s):** 12596-46-2 12596-47-3 12596-49-5 14336-95-9 14452-59-6 14808-04-9 17341-24-1 20504-52-3 39383-18-1 39383-19-2 57363-78-7

Li

**Molecular Formula:** Li

**Molecular Weight:** 6.941

**Accurate Mass:** 7.016003

**Percentage Composition:** Li 100.00%

Arfvedson (Stockholm) and isol. in 1821 by W.T. Brande. Abundance: 18 ppm (earth's crust), 0.2 ppm (sea water). Has no biological role.  $\alpha$ -Form (bcc) transforms into  $\beta$ -form (hcp) at  $-195^\circ$ . A ccp form is obtainable by cold working at low temp.

**Source/Synthesis:** Occurs in ferromagnesian minerals in which it replaces Mg. Most important mineral is spodumene (Li-Al-silicate) but also petalite and lepidolite. Metal obt. by electrolysis of fused LiCl, or by thermal dec. of  $\text{LiN}_3$

**Use/Importance:** Anode material in high density batteries. Tritium breeder in fusion reactor concepts. Heat transfer medium. Starting material for organolithium compds. Used in alloys, particularly with Al. Scavenger for O and S. Commercially available in several solid forms and dispersed in mineral oil.  $^6\text{Li}$  is also commercially available

**Physical Description:** Silvery white, malleable, lustrous metal which tarnishes in air, turning black owing to formation of  $\text{Li}_3\text{N}$ ,  $\text{Li}_2\text{O}$ ,  $\text{LiOH}$  and  $\text{Li}_2\text{CO}_3$ . Reacts vigorously with  $\text{H}_2\text{O}$  but not quite as violently as the heavier alkali metals

**Melting Point:** Mp  $180.5^\circ$

**Boiling Point:** Bp  $1340^\circ$  ( $1326^\circ$ )

**Solubility:** Sol.  $\text{NH}_3$  (l)  $\rightarrow$  blue-black soln.

**Other Data:** Lithium salts give a crimson colour to a flame

**Hazard & Toxicity:** Finely divided metal may ignite spontaneously. Vig. reaction with  $\text{H}_2\text{O}$ . Must be stored under  $\text{O}_2$ -free, dry oil

**Aldrich:** 37239-0

**Fluka:** 62371

## >>Variant: Lithium 5

**Source/Synthesis:** Prod. from He (t,n), He (He,p), also from the isotopes:  $^4\text{He}$ ,  $^6\text{Li}$ ,  $^7\text{Li}$ ,  $^9\text{Be}$ ,  $^{10}\text{B}$  (d,  $^7\text{Li}$ )

**Other Data:**  $I = -3/2$ . Decays by  $\alpha$  emission and proton emission

## >>Variant: Lithium 6

**CAS Registry Number:** 14258-72-1

**Other Data:**  $I = +1$ ;  $\mu = +0.8220467 \mu_N$ . Nmr relative sensitivity ( $^1\text{H}=1.00$ )  $8.5 \times 10^{-3}$ ; receptivity ( $^{13}\text{C}=1.00$ ) 3.58

## >>Variant: Lithium 7

**CAS Registry Number:** 13982-05-3

**Use/Importance:** Preferred isotope for nmr spectroscopy

**Other Data:**  $I = -3/2$ ;  $\mu = +3.256424 \mu_N$ . Nmr relative sensitivity ( $^1\text{H}=1.00$ ) 0.29; receptivity ( $^{13}\text{C}=1.00$ ) 1540

## >>Variant: Lithium 8

**CAS Registry Number:** 13981-63-0

**Source/Synthesis:** Prod. from Li (n, $\gamma$ ), or Li (d,p)

**Other Data:**  $I = +2$ ;  $\mu = +1.6536 \mu_N$ . Decays by  $\beta^{(-)}$  emission to  $^8\text{Be}$ , or by  $\alpha$  emission

## >>Variant: Lithium 9

**CAS Registry Number:** 14809-39-3

**Source/Synthesis:** Prod. from Be (n,p), Be (d,2p),  $^{10}\text{Be}$  ( $^{11}\text{B}$ ,  $^{12}\text{C}$ ),  $^3\text{H}$  ( $^7\text{Li}$ ,p), or by proton bombardment of Ir

**Other Data:**  $I = -3/2$ ;  $\mu = +3.439 \mu_N$ . Decays by  $\beta^{(-)}$  emission to  $^9\text{Be}$ , also by  $\alpha$  emission and neutron emission

## >>Variant: Lithium 11