Lithium (Li)

Element 3 — Complete Summary

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3
Li
Lithium
6.94

Key Properties

Atomic Mass	6.94
Category	Alkali Metals
State at 20°C	solid
Melting Point	180.50°C
Boiling Point	1342°C
Density	0.534
Electron Config	[He] 2s1
Electronegativity	0.98
Year Discovered	1817
Discovered By	Johan August Arfwedson

✨ Did You Know?

1. It is the lightest of all metals and is so low in density that it can float on water (before it reacts vigorously).
2. It is a key component in mood-stabilizing drugs used to treat bipolar disorder.
3. When it burns, it produces a striking crimson-red flame, which is why it's used in fireworks.
4. Despite being a metal, it is soft enough to be cut with a butter knife.
5. The vast majority of the world's lithium is not mined from rock but extracted from underground brine reservoirs.

APPEARANCE
A soft, silvery-white, and very light metal.

SUPERHERO PERSONA
"The Recharger, a hero with immense energy, powering every device in the modern world."

EVERYDAY CONNECTION
The rechargeable battery in your phone or laptop.

POP CULTURE
The power source for advanced technology in many science fiction stories.

Lithium: The Lightest Metal for Modern Batteries

Lithium is a soft, silvery alkali metal with the atomic number 3. It is the lightest of all metals and reacts vigorously with water, producing hydrogen gas and heat. While pure lithium is rarely seen, its compounds are essential in everything from rechargeable batteries to medicine.

Why Is Lithium So Useful?

Lithium’s low density and high electrochemical potential make it one of the most valuable elements in modern technology.

Rechargeable Batteries: Lithium-ion batteries power smartphones, laptops, and electric vehicles, thanks to their high energy density and lightweight nature. Lithium is also used in non-rechargeable batteries for medical implants like pacemakers.

Lightweight Alloys: Lithium alloys with aluminum and magnesium are used in aircraft, high-speed trains, and armor plating, making materials both lighter and stronger.

Lubricants & Cooling Systems: Lithium stearate is used in high-temperature lubricants, while lithium chloride and bromide are key in air conditioning and industrial drying systems because of their strong ability to absorb moisture.

Medicine: Lithium carbonate is widely prescribed for the treatment of bipolar disorder, stabilizing mood swings, though its precise action in the brain remains under study.

Natural Abundance and Production of Lithium

Lithium is not found in its metallic form in nature. Instead, it is present in minerals and brines:

Minerals: Important sources include spodumene and petalite in igneous rocks.

Brines: Today, most lithium comes from salt flats in Chile, Argentina, and Bolivia, where lithium carbonate is extracted from brine deposits.

Metal Extraction: Pure lithium is produced by the electrolysis of molten lithium chloride.

History of Lithium

1790s: The first lithium mineral was discovered.

1817: Swedish chemist Johan August Arfvedson identified a new alkali metal in the mineral petalite and named it lithium (from the Greek lithos, meaning “stone”).

1855: German chemist Robert Bunsen and British chemist Augustus Matthiessen isolated pure lithium metal in bulk using electrolysis.

Biological Role of Lithium

Lithium is not an essential nutrient, but in medicine it plays a crucial role in psychiatry. Controlled doses of lithium carbonate are used to treat bipolar disorder and depression, though excessive amounts are toxic.