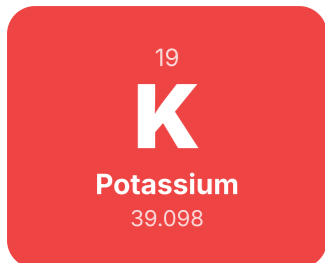


Potassium (K)

Element 19 — Complete Summary

thepredictable.io



Key Properties

Atomic Mass	39.098
Category	Alkali Metals
State at 20°C	solid
Melting Point	63.5°C
Boiling Point	759°C
Density	0.862
Electron Config	[Ar] 4s1
Electronegativity	0.82
Year Discovered	1807
Discovered By	Humphry Davy

Did You Know?

- 1 Potassium explodes on contact with water, burning with a beautiful lilac (light purple) flame! It's one of the most reactive elements on Earth.
- 2 It's a super soft metal, so soft you can cut it with a butter knife!
- 3 Your body can't function without it! Potassium is a critical electrolyte that helps nerve signals fire, muscles contract, and maintains fluid balance.
- 4 It's a key ingredient in fertilizers, often called 'potash,' helping plants grow strong roots and improving crop yield worldwide.
- 5 Its name comes from 'pot ash,' as it was first isolated from the ash of burnt wood, where it concentrates.
- 6 Its chemical symbol, K, comes from the Latin word 'kalium,' which is derived from the Arabic 'al-qali,' meaning 'plant ash.'
- 7 Humphry Davy first isolated potassium in 1807 using electrolysis, literally ripping it out of molten potassium hydroxide with electricity!
- 8 Along with sodium, potassium creates the electrical potential across your cell membranes – essentially powering your brain and nervous system!
- 9 Because it's so reactive with air and water, potassium metal is always stored under mineral oil or kerosene to keep it safe and stable.
- 10 It's crucial for regulating your heartbeat; too much or too little potassium in your body can cause serious health problems.

APPEARANCE

A soft, silvery-white metal that tarnishes from shiny to dull in mere seconds when exposed to air.

SUPERHERO PERSONA

"Potassium, the Life Spark, keeps your heart beating and muscles flexing with essential electrical charges, but throw it in water and watch out – it's an explosive, fiery showstopper!"

EVERYDAY CONNECTION

The essential nutrient found in your favorite banana, keeping your body's electrical system humming smoothly.

POP CULTURE

Think of it as the explosive special effect in an action movie, but happening naturally when it meets water!

Overview of Potassium

Potassium is a soft, silvery alkali metal with atomic number 19. It tarnishes rapidly in air and reacts violently with water, releasing hydrogen gas that ignites with a lavender-colored flame. Although pure potassium metal is rarely seen outside of laboratories, its compounds are essential for both life and industry.

Why Is Potassium So Useful?

The greatest demand for potassium compounds comes from agriculture and industry:

Fertilizers: Potassium is a vital macronutrient for plants, helping them regulate fluid balance, improve photosynthesis, and grow strong. Potassium salts like potassium chloride and potassium sulfate are widely used in fertilizers to boost crop yields.

Glassmaking: Potassium carbonate is used to manufacture glass, giving it improved strength and clarity.

Cleaning products: Potassium hydroxide is a key ingredient in liquid soap, detergents, and bleaches.

Medicine: Potassium chloride is used in saline drips, supplements, and pharmaceuticals to treat deficiencies and support normal bodily functions.

Biological Role of Potassium

Potassium is essential for all living things, especially for nerve signaling and muscle contraction.

In humans: Potassium ions regulate fluid and electrolyte balance in the body. An average adult consumes up to 7 grams per day and stores about 140 grams inside their cells.

Dietary sources: Potassium-rich foods include bananas, potatoes, nuts, leafy greens, and sardines.

Radioactivity: The isotope potassium-40 is mildly radioactive. While harmless in normal amounts, its slow decay may contribute to natural genetic mutations over time.

■ **Natural Abundance and Production of Potassium**

Potassium makes up about 2.4% of Earth's crust, making it the seventh most abundant metal. However, it is never found in its pure metallic form due to its reactivity.

Common minerals: Potassium is found in salts such as sylvite (KCl) and carnallite ($\text{KMgCl}_3 \cdot 6\text{H}_2\text{O}$), often left behind by evaporated ancient seas.

Commercial production: Potassium compounds are mined from these minerals, particularly from underground deposits in Canada, Russia, and Belarus.

■ **History of Potassium**

Early uses: Potassium salts have been known since antiquity and were used in gunpowder, soap-making, and glass. The name "potash" comes from "pot ash," describing the method of leaching potassium salts from wood ash.

1807 – Isolation: Potassium was the first metal isolated by electrolysis. Sir Humphry Davy passed an electric current through moist potash (potassium carbonate), successfully producing pure potassium metal. He noted its violent reaction with water and the lavender flame it produced.