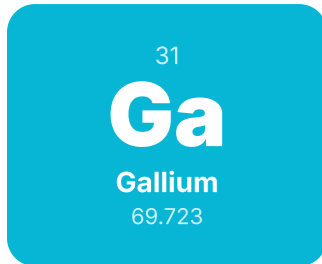


Gallium (Ga)

Element 31 — Complete Summary
theperiodictable.io



Key Properties

Atomic Mass	69.723
Category	Post-Transition Metals
State at 20°C	solid
Melting Point	29.7646°C
Boiling Point	2229°C
Density	5.91
Electron Config	[Ar] 3d104s24p1
Electronegativity	1.81
Year Discovered	1875
Discovered By	Paul-Émile Lecoq de Boisbaudran

Did You Know?

- 1 Hold it in your hand, and poof! Gallium melts at just 29.76 °C (85.57 °F), turning into a silvery liquid right in your palm – cooler than a magic trick!
- 2 But don't call it 'liquid metal' all the time! At room temperature, it's a solid, shiny, silvery-white metal that looks totally normal.
- 3 It's a glass-wetter! Unlike mercury, which beads up, liquid Gallium loves to stick to and 'wet' glass, leaving behind a shiny, mirror-like film.
- 4 Superstar in your tech: Gallium is critical for Gallium Nitride (GaN), which powers the vibrant blue and white LEDs in your phone, screens, and even Blu-ray players!
- 5 Speed demon in circuits: Gallium Arsenide (GaAs) semiconductors are super fast, making them essential for your cell phones, satellites, and high-speed computer chips.
- 6 The element whisperer, Mendeleev, actually predicted Gallium's existence and properties way back in 1871, calling it 'eka-aluminum' before it was even discovered!
- 7 Forget mercury thermometers! Gallium-based alloys like Galinstan (Gallium, Indium, Tin) are taking over, giving us non-toxic, safe ways to measure temperature.
- 8 It defies the rules! Unlike most metals, Gallium expands when it freezes, just like water. So, don't try to freeze it in a sealed glass container – it'll burst!
- 9 Its name is a shout-out to France! Discovered by French chemist Paul-Émile Lecoq de Boisbaudran in 1875, he named it 'Gallium' after 'Gallia,' the Latin name for France.
- 10 Gallium is a hungry metal! It can form alloys with many other metals, sometimes even dramatically lowering their combined melting points.

APPEARANCE

A shiny, silvery-white metal that literally melts in the palm of your hand, turning into a liquid mirror.

SUPERHERO PERSONA

"The 'Melt-in-Your-Hand' Maestro, Gallium effortlessly transforms from solid to liquid, proving that even the toughest exteriors can have a secret soft spot. But don't let its gentle touch fool you; it's a high-tech hero powering our digital world!"

EVERYDAY CONNECTION

Think of those super-bright LED lights or the 'liquid metal' in some sci-fi movies – Gallium is often behind the magic!

POP CULTURE

Its 'liquid metal' vibe totally reminds us of the shape-shifting T-1000 from Terminator 2, but way less destructive!

Overview of Gallium

Gallium is a soft, silvery-white post-transition metal with atomic number 31. It is best known for its unusually low melting point of just 29.8 °C (85.6 °F)—warm enough to melt in the palm of your hand. Despite this, it also has a very high boiling point (about 2400 °C / 4352 °F), giving it a wide liquid range that makes it especially useful in scientific and industrial applications.

Uses of Gallium

Gallium is an important element in modern technology, particularly in electronics and optoelectronics:

Semiconductors: Gallium arsenide (GaAs) and gallium nitride (GaN) are key semiconductor materials, often used where silicon is less effective.

LEDs and solar panels: GaAs is used in red LEDs and high-efficiency solar panels, including those on satellites and spacecraft such as the Mars Exploration Rover.

High-tech devices: GaN is used in Blu-ray technology, smartphones, blue and green LEDs, and high-frequency power electronics.

Low-melting alloys: Gallium alloys with most metals, forming low-melting mixtures used in electric fuses, thermal switches, and medical thermometers as a safer alternative to mercury.

High-temperature thermometers: Because of its high boiling point, gallium is also used in thermometers designed to withstand temperatures that would vaporize mercury.

Natural Occurrence and Production of Gallium

Gallium does not occur in its free state in nature. Instead, it is found in trace amounts in minerals such as bauxite and sphalerite.

By-product metal: Most commercial gallium is obtained as a by-product of zinc and aluminum refining.

Extraction: It is typically separated through the electrolysis of gallium(III) hydroxide.

History of Gallium

1871 – Prediction by Mendeleev: Dmitri Mendeleev predicted the existence and properties of gallium, which he called eka-aluminum. He correctly forecast its atomic weight, density, and chemical behavior, and the later discovery confirmed his periodic table.

1875 – Discovery: French chemist Paul-Émile Lecoq de Boisbaudran discovered gallium while analyzing the spectrum of a zinc ore, noticing an unexpected violet line. He later isolated the pure metal, naming it gallium after France (Gallia in Latin).

Biological Role of Gallium

Gallium has no known biological role. It is considered non-toxic and has even been investigated for potential medical applications, including anti-cancer drugs and treatments for bone disease, though these are experimental.