Indium (In)

Element 49 — Complete Summary

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49
In
Indium
114.818

Key Properties

Atomic Mass	114.818
Category	Post-Transition Metals
State at 20°C	solid
Melting Point	156.60°C
Boiling Point	2027°C
Density	7.31
Electron Config	[Kr] 4d105s25p1
Electronegativity	1.78
Year Discovered	1863
Discovered By	Ferdinand Reich & Hieronymus Theodor Richter

✨ Did You Know?

1. The primary application of indium is to make indium tin oxide (ITO), which is transparent and electrically conductive, making it essential for producing LCD screens, touch panels, and solar cells.
2. When a bar of pure indium is bent, it emits a distinctive high-pitched \
3. It is named after the color indigo, because of the bright indigo-blue line in its atomic spectrum.
4. Indium is so soft that you can easily bite into it or scratch it with your fingernail.
5. It 'wets' glass, meaning it can adhere to it, which is a rare property for metals.

APPEARANCE
Indium is a very soft, silvery-white metal.

SUPERHERO PERSONA
"The Touchscreen Titan, the invisible hero whose conductive touch makes all our screens work."

EVERYDAY CONNECTION
Indium is found in the transparent coating on a smartphone or tablet screen.

POP CULTURE
Indium is a key component in futuristic transparent displays and holoscreens.

Overview of Indium

Indium is a soft, silvery-white post-transition metal with atomic number 49. It is stable in both air and water, but it is rarely found in nature in its pure form. Indium is best known for its crucial role in modern electronics, where its compounds allow for the creation of materials that are both transparent and electrically conductive—a combination essential for displays and touch technology.

Why Is Indium So Useful?

Indium's value lies in its unique physical and electronic properties, particularly in the form of indium tin oxide (ITO):

Touch screens and displays: ITO is a thin film that is both transparent and conductive, making it essential in smartphones, flatscreen TVs, tablets, and solar panels.

Semiconductors: Indium compounds such as indium nitride (InN) and indium phosphide (InP) are used in transistors, LEDs, and high-speed microchips.

Specialty coatings: Indium sticks strongly to glass, making it useful for mirror coatings on skyscraper windows and welders' goggles.

Low-melting alloys: Indium forms alloys with very low melting points, which were once used in fire-sprinkler systems. It has also been used in high-performance ball bearings (such as in Formula 1 racing) to reduce friction.

Biological Role of Indium

Indium has no known biological role in humans or other organisms. However, it can be toxic in high doses, with studies showing that excessive exposure may harm embryonic or fetal development.

Natural Abundance and Production of Indium

Indium is one of the least abundant elements in Earth's crust. It is not found as a native metal but occurs in trace amounts within other ores:

Main sources: Indium is primarily recovered as a by-product of zinc refining, but it is also associated with copper, iron, and lead ores.

Global supply: Because it is only obtained as a by-product, indium supply is closely tied to zinc mining and demand.

History of Indium

1863 – Discovery: Indium was discovered in Freiberg, Germany, by chemists Ferdinand Reich and Hieronymous Richter. Reich, who was colorblind, was studying zinc ores for thallium.

Spectral evidence: Richter examined the spectrum and observed a brilliant indigo-colored line that revealed a new element.

Naming: The element was named indium after the Latin word indicum ("indigo") to reflect its distinctive spectral signature.