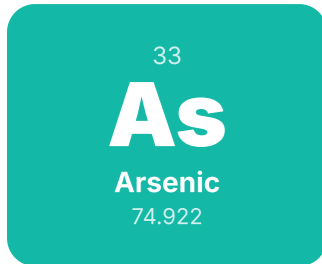


Arsenic (As)

Element 33 — Complete Summary
theperiodictable.io



Key Properties

Atomic Mass	74.922
Category	Metalloids
State at 20°C	solid
Melting Point	Sublimes at 616°C
Boiling Point	Sublimes at 616°C
Density	5.727
Electron Config	[Ar] 3d104s24p3
Electronegativity	2.18
Year Discovered	1250
Discovered By	Albertus Magnus

Did You Know?

- Invisible Threat**: Arsenic earned its infamous title, the 'King of Poisons,' because it's often odorless, tasteless, and colorless when dissolved, making it incredibly difficult to detect historically.
- Tech Transformer**: This element is a vital player in high-speed electronics! Gallium arsenide, containing arsenic, is used in smartphones, satellites, and LEDs because it conducts electricity super fast.
- Nature's Dark Side**: Arsenic isn't just man-made evil; it occurs naturally in Earth's crust, found in rocks, soil, and even dissolved in groundwater in many parts of the world.
- Color Chameleon**: Pure arsenic exists in different forms called allotropes—from a shiny metallic gray to a less stable, waxy yellow, and even a black, glass-like form!
- Deadly Decor**: In the 19th century, arsenic compounds like 'Paris Green' and 'Scheele's Green' were popular vibrant pigments used in paints, wallpapers, and even clothing—unwittingly poisoning people for fashion!
- Sublime!**: Unlike most substances that melt, arsenic *sublimes* when heated at atmospheric pressure. That means it goes directly from a solid to a gas without ever becoming a liquid!
- Historical 'Medicine'**: Believe it or not, arsenic compounds were once used in folk remedies and even mainstream medicines, like Fowler's solution for treating fevers and syphilis—a risky cure!
- Trace Amounts Everywhere**: You might be surprised to learn that tiny, safe amounts of arsenic are naturally present in some foods, especially rice and certain seafood, absorbed from the environment.
- Wood Protector**: Arsenic compounds have been used as powerful wood preservatives (Chromated Copper Arsenate or CCA) to protect lumber from insects and decay, significantly extending its lifespan.
- Star Power**: It's classified as a metalloid, meaning it has properties of *both* metals and nonmetals, giving it unique chemical behavior that makes it incredibly versatile (and dangerous!).
- Element 33**: Arsenic sits at number 33 on the Periodic Table, nestled between Germanium and Selenium, a prime position for its dual nature.
- Ancient Discovery**: Evidence suggests ancient civilizations, including the Egyptians and Greeks, were aware of arsenic compounds as early as 3000 BC, using them in metallurgy and poisons!

APPEARANCE

Looks like a dull metallic gray, but don't be fooled—its true power is often invisible or insidious!

SUPERHERO PERSONA

"The Stealthy Saboteur: A master of disguise, this element silently enhances high-speed electronics or delivers a deadly, unseen punch."

EVERYDAY CONNECTION

That vibrant green wallpaper from historical mansions? Sometimes it literally glowed with a toxic secret!

POP CULTURE

Known as the 'King of Poisons' and 'Poison of Kings,' it's the ultimate villain in countless historical thrillers and detective novels.

Overview of Arsenic

Arsenic is a silver-gray, brittle semi-metal (metalloid) known both for its toxicity and its wide range of uses. Historically infamous as a deadly poison, arsenic has also played important roles in medicine, agriculture, and modern technology. This contradictory nature has made arsenic one of the most studied and controversial elements in history.

Uses of Arsenic

Despite its toxic reputation, arsenic and its compounds are applied in several fields:

Pest control and medicine: Arsenic compounds have long been used as rat poisons and insecticides, though most uses are now tightly regulated. Historically, tonics such as "Fowler's Solution" contained arsenic, and today certain organic arsenic compounds are used in poultry feed to prevent disease.

Semiconductors: Gallium arsenide (GaAs) is a vital material in the electronics industry, used to make transistors, integrated circuits, and solar cells. Arsenic acts as a doping agent, altering the electrical properties of semiconductors.

Other applications: Arsenic compounds are employed in pyrotechnics, for hardening lead shot, and in producing specialty glass.

■ Natural Occurrence and Production of Arsenic

Arsenic is rarely found in its pure elemental state. Instead, it commonly occurs in minerals such as arsenopyrite (FeAsS). It is typically obtained as a by-product of copper, lead, and gold refining. Extraction from arsenopyrite involves heating the mineral, which causes arsenic to sublime (transform directly from solid to gas), separating it from iron sulfide.

■ History of Arsenic

Ancient knowledge: Arsenic sulfide minerals such as orpiment and realgar were used in ancient Egypt, Greece, and China for pigments, gilding, and pesticides. Their poisonous nature was also well known.

Discovery of the element: The German scholar Albertus Magnus is credited with isolating metallic arsenic in the 1200s. He did so by heating arsenic trioxide ("white arsenic") with oils, producing a gray metallic form.

■ Biological Role of Arsenic

Arsenic has no essential biological role in humans and is considered toxic. Prolonged exposure can accumulate in the body, especially in hair and nails, where it binds to proteins. Some foods, such as seafood, contain arsenic in less harmful organic forms. Chronic exposure to inorganic arsenic compounds is a major health concern in contaminated groundwater.