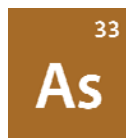


Stable Isotopes of Arsenic

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Nuclear Spin
As-75	33	42	74.921597	100.00%	3/2-



Arsenic compounds were mined by the early Chinese, Greek and Egyptian civilizations. It is believed that Albertus Magnus obtained the element in 1250 AD by heating soap together with orpiment (arsenic trisulfide, used as a dye or pigment). The element takes its name from the Greek word *arsenikon*, meaning "yellow orpiment."

Arsenic is a silver-gray, brittle, crystalline solid that is stable in dry air. Exposure to moist air tarnishes its surface to a golden bronze color, which converts to a black oxide on further exposure. Three allotropes are known: the *α-metallic form*, the black amorphous vitreous solid known as *β-arsenic*, and a *yellow allotrope*. It is insoluble in water as well as in caustic and nonoxidizing acids. Arsenic is attacked by HCl in the presence of oxidant, and it reacts with nitric acid. Arsenic sublimates at 613 °C when heated at normal atmospheric pressure. It has densities of 5.72 g/cc (in the *β-metallic form*) and 4.70 g/cm (in the *β-amorphous form*).

The major uses of arsenic are in metallurgy — primarily as an additive to lead, copper, brass and many lead-based bearing alloys — to improve their mechanical and thermal properties. The addition of very small quantities of arsenic to copper enhances copper's corrosion resistance. It also prevents cracking in brass.

Elemental arsenic is much less toxic than its soluble compounds. Only its uncommon yellow allotrope is highly toxic. Inhalation of its metal dusts can cause ulceration of the nasal septum. Ingestion may produce systemic skin and gastrointestinal effects in humans. Arsenic and its compounds are human carcinogens, producing liver tumors.

Properties of Arsenic

Name	Arsenic
Symbol	As
Atomic number	33
Atomic weight	74.9216
Standard state	Solid at 298 °K
CAS Registry ID	7440-38-2
Group in periodic table	15
Group name	Pnictogen
Period in periodic table	4
Block in periodic table	p-block

Properties of Arsenic (continued)

Color	Metallic gray
Classification	Semi-metallic
Melting point	817 °C at 28 atm
Boiling point	613 °C subl.
Thermal conductivity	50.00 W/(m·K)
Electrical resistivity	33.30 $\mu\Omega\cdot\text{cm}$ at 20 °C
Electronegativity	2.18
Specific heat	328.00 J/(kg·K)
Heat of vaporization	32.40 $\text{kJ}\cdot\text{mol}^{-1}$
Heat of fusion	27.70 $\text{kJ}\cdot\text{mol}^{-1}$
Density of liquid	5.22 g/cm^3 at 817 °C
Density of solid	5.727 g/cm^3
Covalent radius	As^{3+} :1.21 Å
Electron configuration	$[\text{Ar}]4s^23d^{10}4p^3$
Principal oxidation states	-3, 0, +3, +5