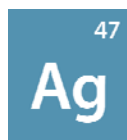


Stable isotopes of silver available from ISOFLEX

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Enrichment Level	Chemical Form
Ag-107	47	60	106.90509	51.84%	>99.00%	Metal
Ag-109	47	62	108.904756	48.16%	>99.00%	Metal



Silver has been known since ancient times. It is mentioned in Genesis, and slag dumps in Asia Minor and on islands in the Aegean Sea indicate that humans learned to separate silver from lead as early as 3000 BC. It takes its name from the Anglo-Saxon word *siolfur*, meaning “silver” — the origin of the symbol *Ag* is the Latin word *argentum*, also meaning “silver.”

A white metal with brilliant metallic luster and face-centered cubic crystals, silver also has the highest electrical and thermal conductivity of all metals. It resists oxidation but tarnishes in air through reaction with atmospheric sulfur compounds, as well as with mercury. It is soluble in nitric acid and alkali cyanide solutions, and insoluble in water and alkalis.

At ordinary temperatures, silver is not affected by either dry or moist air. At a temperature just above its melting point, silver absorbs a large volume of oxygen, greater than ten times its own volume. Such oxygen absorption, however, drops dramatically below its melting point; just before solidification, the absorbed oxygen is ejected violently. Silver also absorbs hydrogen above 800 °C. Exposure of pure silver at about 810 °C alternately to both hydrogen and oxygen gases embrittles the metal. Silver reacts with halogens at elevated temperatures, forming halides. It is attacked by nitric acid at all concentrations. It dissolves very slowly in hot concentrated sulfuric acid, forming silver sulfate. It is attacked by ozone, hydrogen peroxide, chromic acid, ferric sulfate and permanganate solutions.

Silver and its alloys and compounds have numerous applications. As a precious metal, silver is used in jewelry. One of its alloys, sterling silver, containing 92.50 weight % silver and 7.50 weight % copper, is a jewelry base that is used in tableware and decorative pieces as well. The metal and its copper alloys are also used in coins.

Silver-copper crazing alloys and solders have applications in automotive radiators, heat exchangers, electrical contacts, steam tubes, coins and musical instruments. Some other uses of silver metal include electrodes, catalysts, mirrors and dental amalgam. Silver is used as a catalyst in oxidation reductions involving conversions of alcohol to aldehydes, ethylene to ethylene oxide, and ethylene glycol to glyoxal. Many silver compounds — such as silver nitrate, silver chloride and silver oxides — have wide commercial applications: their most important uses are in photography and batteries.

All water-soluble silver salts are toxic, and ingestion can cause severe poisoning. Silver is listed by the United States Environmental Protection Agency as one of the priority pollutant metals in the environment.

Properties of Silver

Name	Silver
Symbol	Ag
Atomic number	47
Atomic weight	107.87
Standard state	Solid at 298 °K
CAS Registry ID	7440-22-4
Group in periodic table	11
Group name	Coinage metal
Period in periodic table	5
Block in periodic table	d-block
Color	Silver
Classification	Metallic
Melting point	961.8 °C
Boiling point	2212 °C
Thermal conductivity	429 W/(m·K) at 298.2 °K
Electrical resistivity	1.586 $\mu\Omega\cdot\text{cm}$ at 20 °C
Electronegativity	1.9
Specific heat	0.23 kJ/kg K
Heat of vaporization	255.00 kJ·mol ⁻¹ at 2212 °C
Heat of fusion	11.50 kJ·mol ⁻¹
Density of liquid	9.32 g/cm ³ at 961.8 °C
Density of solid	10.49 g/cm ³
Electron configuration	[Kr]4d ¹⁰ 5s ¹
Atomic radius	1.442 Å
Ionic radius	1.00 Å (coordination number 4) and 1.15 Å (coordination number 6)
Oxidation states	+1, +2
Most common oxidation state	+1