

Silver (Ag)

Silver is a Group 11 transition metal with a filled 4d subshell and one 5s electron in the isolated-atom configuration. It combines very high electrical conductivity, strong visible reflectance and distinctive surface chemistry.

47	Ag	107.8682
Atomic number	Silver	Relative atomic mass / mass display

1. Quick facts

Property	Value	Meaning for a student
Atomic number	47	47 protons
Electrons	47	neutral Ag atom
Electron configuration	[Kr] 4d ¹⁰ 5s ¹	ground-state shorthand
Relative atomic mass	107.8682	natural isotope-weighted value
Natural isotopes	Ag-107, Ag-109	both stable
Group / period	11 / 5	d-block transition metal

2. Atomic structure and electron configuration

Atomic feature	Value	How to read it
Protons	47	Atomic number fixes identity.
Crystal	FCC	Face-centred cubic metal.
Common oxidation state	+1	Dominant simple silver chemistry.
Appearance	Silvery-white	Bulk optical response, not an atom color.

3. Signature idea

Why does silver conduct electricity so well?

Electrical conduction in solid silver is a collective band property with mobile electrons moving through the crystal. It should not be pictured as one 5s electron orbiting freely around one atom.

Why does silver tarnish?

Sulfur-containing environments can react at the surface and produce dark silver-sulfide-rich tarnish. Tarnish is a surface chemical change, not the intrinsic color of clean bulk silver.

4. Properties, phase behavior and evidence

Property	Value	Meaning for a student
Non-bonded radius	2.11 Å	RSC reference definition.
Electron affinity	125.624 kJ/mol	Gaseous neutral-atom reference.
Electronegativity	1.93	Pauling scale.
1st ionization energy	730.995 kJ/mol	Gaseous atom.

Evidence context

Use values with their stated definitions, conditions and evidence status. Phase-transition temperatures describe a chosen pressure path; predicted or unknown properties are never presented as direct measurements.

5. Where on Earth?

Modern production is not the same as natural occurrence

USGS Mineral Commodity Summaries 2026 estimates about 26,000 metric tons of world silver mine production in 2025. Mexico, Peru and China are among the largest producers; reserves and production figures are source-year dependent.

Geography rule

The full interactive guide distinguishes natural occurrence from modern production, reserves or research locations. A map layer is labeled by what it actually represents.

6. Representative compounds / forms

Silver(I) oxide / Ag ₂ O	A brown-black Ag(I) oxide.
Silver chloride / AgCl	A light-sensitive Ag(I) halide important in classic photographic chemistry.

7. Isotope snapshot

Isotope	Nucleus	Natural abundance / status
Ag-107	47 p / 60 n	51.839% - stable
Ag-109	47 p / 62 n	48.161% - stable

8. Questions to ask next

Why does silver conduct electricity so well? Conductivity is a collective solid-state band property with mobile charge carriers.

Why does silver tarnish? Sulfur-containing environments can produce dark silver-sulfide-rich surface layers.

Sources

Royal Society of Chemistry - Silver element data

NIST - Silver atomic/isotopic data

USGS Mineral Commodity Summaries 2026 - Silver

Full interactive guide: <https://elementlookup.com/silver/>