

Strontium (Sr) - Student Datasheet

Atomic number 38 - Alkaline earth metal - Group 2 - Period 5 - s-block

Strontium is element 38, a Group 2 metal best known for Sr^{2+} chemistry, brilliant red emission and isotope applications. Its story links electron structure to fireworks, ferrite magnets, geology and radiogenic ^{87}Sr .

Quick reference

Atomic number	38
Relative atomic mass	87.62
Electron configuration	[Kr] 5s ²
State at 20 C	Soft silvery solid at 20 deg C
Density	2.64 g/cm ³
Melting point	1050 K
Boiling point	1650 K
Common oxidation state	+2
Electronegativity	0.95

Structure & orbitals

Strontium is represented with an ambient-pressure FCC teaching cell. Pressure-induced polymorphs are outside this introductory structure model.

The 5s probability cloud is a hydrogen-like teaching model. It does not show collective electron bands in metallic strontium or the full electronic structure of Sr^{2+} compounds.

Temperature / phase context

At approximately standard pressure, strontium is solid below about 1050 K, liquid to about 1650 K, and gaseous above that reference. High-pressure solid transitions are not placed on this ordinary-pressure teaching track.

Five things to remember

- Atomic number 38 means 38 protons.
- Neutral strontium ends in 5s² and commonly forms Sr^{2+} .
- Strontium compounds can produce a strong red flame/emission color.
- Natural strontium includes four stable isotopes.
- ^{87}Sr can include radiogenic contribution from ^{87}Rb decay, making isotope ratios useful in geology.

Strontium: Real World & Signature Science

Elemental strontium, Sr²⁺ in salts, red-emitting strontium compounds and strontium isotope ratios are related but distinct scientific contexts.

Why this element matters

Red emission Strontium salts are valued for strong red color in pyrotechnic and signal compositions.	Ferrite magnets Strontium compounds are used in hard ferrite permanent magnets.
Geochemical tracer 87Sr/86Sr ratios help trace rocks, waters and biological materials because 87Sr can be radiogenic.	Celestite supply Celestite (SrSO ₄) is an important strontium mineral commodity.
Specialty glass & ceramics Strontium compounds have uses in ceramics, glass and electronic materials.	

From celestite to strontium materials: a high-level path

1. Strontium commonly occurs in minerals such as celestite rather than as native metal.
2. Mining and mineral processing concentrate strontium-bearing material.
3. Industrial conversion produces compounds tailored for magnets, glass, ceramics and other uses; operational recipes are outside this guide.
4. Applications and analytical isotope work use different chemical forms and should not be conflated with elemental strontium metal.

Where on Earth?

Celestite production

Spain, Iran, China and Mexico are selected 2025 production examples; rankings are dated commodity context.

History

1790 - Adair Crawford recognized that a mineral from Strontian, Scotland differed from known barium minerals.

1808 - Humphry Davy isolated strontium by electrochemical methods.

20th century - Strontium compounds became important in red pyrotechnics, ferrite magnets and specialized glass.

Today - Stable and radiogenic strontium isotopes are widely used as tracers in Earth and environmental sciences.

Uses

Pyrotechnic red color Strontium compounds are used to create intense red emission.	Ferrite magnets Strontium ferrite is a widely used permanent-magnet material.
Isotope geochemistry Strontium isotope ratios trace geological and environmental processes.	Glass & ceramics Strontium compounds are used in selected specialty glass, ceramic and electronic materials.

Strontium: Isotopes, Questions & Evidence

Isotopes

88Sr - Stable - most abundant natural isotope

The reference nucleus contains 38 protons and 50 neutrons.

86Sr and 84Sr - Stable natural isotopes

Both contribute to the natural isotope mixture.

87Sr - Stable with radiogenic contribution

87Sr is stable but can be produced by long-lived 87Rb decay, making isotope ratios geologically informative.

Common questions

What is strontium's atomic number?

38.

Is strontium a metal?

Yes. It is an alkaline-earth metal in Group 2.

How many valence electrons does strontium have?

Two, because its neutral ground-state configuration ends in 5s².

Why are strontium compounds used for red color?

Excited strontium species can emit strongly in red wavelengths, which is why strontium salts are common colorants in pyrotechnics.

What mineral is an important source of strontium?

Celestite, SrSO₄, is a major strontium mineral commodity.

Why is 87Sr important in geology?

87Sr can be produced by 87Rb decay, so isotope ratios can record source and age-related geological information.

Quick self-check

1. Atomic number of strontium? Answer: 38
2. Typical ion? Answer: Sr²⁺
3. Common pyrotechnic color? Answer: Red
4. Important ore mineral? Answer: Celestite
5. Why is 87Sr geochemically useful? Answer: It can be radiogenic from 87Rb

Evidence & provenance

Atomic and phase values are evaluated references. Commodity-map points are dated examples of celestite production, not a permanent ranking or a map of every occurrence.

Core sources

Royal Society of Chemistry - Strontium	https://periodic-table.rsc.org/element/38/strontium
NIST - Atomic Data for Strontium	https://physics.nist.gov/PhysRefData/Handbook/Tables/strontiumtable1.htm
USGS - Mineral Commodity Summaries 2026	https://pubs.usgs.gov/publication/mcs2026