Samarium (Sm)

Element 62 — Complete Summary

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62
Sm
Samarium
150.36

Key Properties

Atomic Mass	**150.36**
Category	**Lanthanides**
State at 20°C	**solid**
Melting Point	**1072°C**
Boiling Point	**1794°C**
Density	**7.52**
Electron Config	**[Xe] 4f66s2**
Electronegativity	**1.17**
Year Discovered	**1879**
Discovered By	**Paul-Émile Lecoq de Boisbaudran**

✨ Did You Know?

1. Samarium was discovered in 1879 by Paul-Émile Lecoq de Boisbaudran, making it one of the first 'rare earth' elements to be truly separated and identified.
2. It holds a unique title: Samarium is the very first chemical element to be named after a person! It got its name from the mineral 'Samarskite', which was named after Russian mining official Colonel Vasili Samarsky-Bykhovets.
3. Prepare for power! When combined with cobalt, Samarium forms incredibly strong permanent magnets (SmCo) that can handle much higher temperatures than their Neodymium counterparts, perfect for high-performance motors.
4. This element is a lifesaver in disguise! A specific isotope, Samarium-153, is used in targeted radiation therapy to relieve pain from metastatic bone cancer. It's literally a medical superhero!
5. In nuclear reactors, Samarium-149 is a neutron-guzzling champion! It's so good at absorbing neutrons that it helps regulate the nuclear chain reaction, acting as an atomic brake.
6. Beyond magnets and medicine, Samarium compounds are used to add unique colors to glass and ceramics, often producing beautiful yellow or reddish-brown hues.
7. Samarium-doped crystals are vital components in some types of infrared lasers, which have applications from fiber optics to medical surgery.
8. Though dubbed a 'rare earth' element, Samarium isn't actually super rare in Earth's crust, just rarely found in concentrated, easily extractable deposits.
9. It's quite a reactive metal! Samarium readily oxidizes (rusts) in the air, similar to iron, and even reacts with cold water, making it a bit finicky to handle.
10. Imagine glass that blocks heat! Samarium is used in special optical glass that can absorb infrared light, making it useful in certain filter applications.
11. Scientists are exploring Samarium compounds for thermoelectric applications, where they could convert waste heat directly into electricity – a clean energy dream!

👁 APPEARANCE
A shiny, silvery-white metal that quickly dulls when exposed to air.

🦸 SUPERHERO PERSONA
"Meet 'The Magnetic Maverick'! This element is a master of super-strong magnets and a silent hero in nuclear power plants, controlling atomic reactions with incredible precision."

🔗 EVERYDAY CONNECTION
Powers the tiny, mighty magnets in your headphones and electric car motors, keeping your tech humming!

🎬 POP CULTURE
If elements had a hall of fame, Samarium would be 'The First Element Named After a Person' – talk about legacy!

Samarium: The Rare Earth Magnet

Samarium is a silvery-white metal and one of the lanthanides, also known as the rare earth elements. Its most important use is in creating super-strong magnets that power everything from microwaves to industrial machines.

Why Is Samarium Useful?

Samarium has several high-tech and industrial uses:

Samarium–Cobalt Magnets: Alloys of samarium and cobalt make extremely powerful magnets. Unlike normal iron magnets, they can resist very high temperatures without losing strength, making them ideal for microwaves, headphones, and industrial motors.

Nuclear Reactors: Samarium is an excellent neutron absorber, so it’s used in control rods to help regulate the rate of nuclear fission.

Optics & Lighting: Samarium compounds are used in lasers, special glasses, and ceramics. Along with other rare earths, it was once used in carbon arc lamps for studio lighting and projectors.

Natural Abundance & History

Samarium occurs with other rare earth metals in minerals like monazite and bastnaesite. Separating it is tricky, requiring ion exchange and solvent extraction, but it can also be made by reducing samarium oxide with barium.

1879 – Discovery: French chemist Paul-Émile Lecoq de Boisbaudran discovered samarium while studying the mineral didymium, which was long thought to be a single element. He noticed unusual reactions that revealed a new element, which he named samarium after the mineral samarskite.

Later, scientists realized that even samarium wasn’t “pure”—it still contained other undiscovered rare earths, including gadolinium and europium.

Biological Role

Samarium has no known role in living organisms and is considered to have low toxicity compared to many metals.