

**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-cobalt magnets were the first type of high-strength rare-earth magnet developed and are the second-strongest type after neodymium magnets.
- 2 A key advantage of samarium-cobalt magnets is that they can withstand much higher temperatures than neodymium magnets before losing their magnetic properties.
- 3 The radioactive isotope samarium-153 is used in a medicine that targets and kills cancer cells, particularly in bone cancer.
- 4 Like many lanthanides, it was discovered spectroscopically from the mineral samarskite, which is how it got its name.
- 5 It is used in control rods in some nuclear reactors to absorb stray neutrons.

APPEARANCE

Samarium is a silvery-white, hard metal.

SUPERHERO PERSONA

"The High-Temp Magnet, a hero whose magnetic power can withstand incredible heat."

EVERYDAY CONNECTION

Samarium is found in high-temperature magnets used in precision-guided missiles.

POP CULTURE

Samarium's radioactive isotopes are used in targeted cancer therapy.

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.