

57
La
Lanthanum
138.905

Key Properties

Atomic Mass	138.905
Category	Lanthanides
State at 20°C	solid
Melting Point	920°C
Boiling Point	3464°C
Density	6.162
Electron Config	[Xe] 5d16s2
Electronegativity	1.1
Year Discovered	1839
Discovered By	Carl Gustaf Mosander

Did You Know?

- 1 It is the first element of the lanthanide series, a group of 15 chemically similar elements.
- 2 Adding lanthanum oxide to glass increases its refractive index and clarity with low dispersion, making it perfect for high-end camera and telescope lenses.
- 3 The metal is so soft it can be cut with a knife.
- 4 Mischmetal, a material used to make the flints in lighters, is about 25% lanthanum.
- 5 Nickel-metal hydride (NiMH) batteries, used in many early hybrid cars, use lanthanum in the negative electrode.

APPEARANCE

Lanthanum is a soft, silvery-white, ductile metal.

SUPERHERO PERSONA

"The Hidden Lens, a hero who was hard to find but now makes vision clearer in high-tech cameras."

EVERYDAY CONNECTION

Lanthanum is found in a high-quality camera lens.

POP CULTURE

Lanthanum is the first of the rare-earth elements, often sought after in futuristic settings.

Overview of Lanthanum

Lanthanum is a soft, silvery-white metal with atomic number 57. It tarnishes quickly in air and burns easily when heated. The element's name comes from the Greek word lanthanein, meaning "to lie hidden," reflecting the difficulty scientists had in isolating it from other rare earth elements. While pure lanthanum has no large-scale commercial use, its alloys and compounds are critical in modern technology.

Why Is Lanthanum So Useful?

Lanthanum's special chemical properties make it important for energy storage, lighting, optics, and industrial catalysis:

Alloys & Hydrogen Storage: A lanthanum-nickel alloy can absorb and store large amounts of hydrogen gas, making it valuable for hydrogen-powered vehicles. Lanthanum is also used in the anodes of nickel-metal hydride (NiMH) batteries, widely used in hybrid cars.

Lighting: Lanthanum compounds are used in carbon arc lamps for cinema projection and studio lighting, producing a bright white light close to natural sunlight.

Optical Glass: Lanthanum(III) oxide (La₂O₃) improves the refractive index and durability of high-quality optical glass used in lenses and camera equipment.

Catalysts: Lanthanum salts act as catalysts in petroleum refining, helping to convert crude oil into gasoline and other fuels.

Natural Abundance and Production of Lanthanum

Minerals: Lanthanum is mainly found in rare earth minerals like monazite and bastnaesite.

Extraction: The element is isolated using ion-exchange and solvent-extraction techniques. Pure lanthanum metal is usually prepared by reducing lanthanum fluoride with calcium.

History of Lanthanum

1839 – Discovery: Swedish chemist Carl Gustav Mosander discovered lanthanum while analyzing a sample of cerium. He noticed it contained a new element, which he successfully separated.

Confirmation: Later, his student Axel Erdmann found lanthanum in a Norwegian mineral, confirming Mosander's discovery.

Rare Earth Puzzle: This was one of the earliest breakthroughs in the long and challenging process of isolating the rare earth elements, which often occur together in minerals.

Biological Role of Lanthanum

Lanthanum has no essential biological role. It is considered moderately toxic, though its La³⁺ ion is sometimes used in research as a biological tracer for calcium (Ca²⁺) because of their chemical similarity.