



Key Properties

Atomic Mass	162.5
Category	Lanthanides
State at 20°C	solid
Melting Point	1412°C
Boiling Point	2567°C
Density	8.54
Electron Config	[Xe] 4f106s2
Electronegativity	1.22
Year Discovered	1886
Discovered By	Paul-Émile Lecoq de Boisbaudran

Did You Know?

- 1 Its name comes from the Greek word 'dysprositos', meaning 'hard to get at', because it was extremely difficult to isolate from its ores.
- 2 It is added in small amounts to neodymium magnets to help them resist losing their magnetism at high temperatures, which is critical for magnets in electric vehicle motors.
- 3 Like terbium, it is used in the magnetostrictive alloy Terfenol-D.
- 4 It has a very high magnetic susceptibility, meaning it is strongly attracted to magnets.
- 5 Dysprosium is also used in control rods in nuclear reactors because of its ability to absorb neutrons.

APPEARANCE

Dysprosium is a soft, bright, silvery metal.

SUPERHERO PERSONA

"The Heat-Resister, a hero who joins forces with Neodymium to keep magnets strong in hot environments like electric car motors."

EVERYDAY CONNECTION

Dysprosium is found as a component of the high-performance magnets in electric vehicles.

POP CULTURE

Dysprosium is used in nuclear control rods due to its ability to absorb neutrons.

Overview of Dysprosium

Dysprosium is a bright, silvery lanthanide metal that reacts readily with air and water. While not widely known to the general public, dysprosium plays a critical role in modern technologies, particularly in renewable energy and electronics. Its name comes from the Greek word dysprositos, meaning "hard to obtain," reflecting the difficulty early chemists faced in isolating it.

Uses of Dysprosium

The unique properties of dysprosium make it valuable in several cutting-edge applications:

Magnets: Dysprosium is alloyed with neodymium to make high-performance permanent magnets. It increases resistance to demagnetization at high temperatures, which is vital for wind turbines, electric vehicle motors, and industrial generators.

Lighting: Dysprosium iodide is used in high-intensity halide discharge lamps, producing a bright white light for stadiums, film production, and specialized lighting.

Nuclear technology: A dysprosium oxide-nickel composite (cermet) is used in nuclear reactor control rods, as it absorbs neutrons effectively while remaining dimensionally stable over time.

Natural Occurrence and Production of Dysprosium

Although considered a "rare earth," dysprosium is more abundant in Earth's crust than tin or lead. It is mainly extracted from monazite and bastnaesite ores.

Extraction involves complex separation techniques such as ion exchange and solvent extraction, followed by reduction of dysprosium trifluoride (DyF₃) with calcium to obtain the pure metal.

History of Dysprosium

1886 – Discovery: French chemist Paul-Émile Lecoq de Boisbaudran discovered dysprosium in Paris, after years of painstaking work separating rare earth elements.

1950 – Pure samples obtained: Reliable samples of pure dysprosium were not available until Frank Spedding and his team at Iowa State University developed ion-exchange chromatography, which allowed efficient separation of lanthanides.

Biological Role of Dysprosium

Dysprosium has no known biological role. It is considered to have low toxicity, but like other lanthanides, it should be handled with care in industrial or laboratory settings.