

**Key Properties**

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|-------------------|----------------------|
| Atomic Mass | 232.038 |
| Category | actinide |
| State at 20°C | solid |
| Melting Point | 1750°C |
| Boiling Point | 4785°C |
| Density | 11.72 |
| Electron Config | [Rn] 6d27s2 |
| Electronegativity | 1.3 |
| Year Discovered | 1828 |
| Discovered By | Jöns Jacob Berzelius |

Did You Know?

- 1 It is named after Thor, the powerful hammer-wielding god of thunder in Norse mythology.
- 2 Thorium is being extensively researched as a potentially safer and more abundant alternative to uranium as a fuel for nuclear power plants.
- 3 Old gas camping lanterns used a 'mantle' containing thorium dioxide, which would glow with a bright white light when heated by a flame.
- 4 High-quality camera lenses made in the mid-20th century often contained thorium oxide to increase their refractive index, but these lenses are slightly radioactive.
- 5 Thorium is about three to four times more abundant in the Earth's crust than uranium.

APPEARANCE

Thorium is a weakly radioactive, silvery metal.

SUPERHERO PERSONA

"The Thunder God, a potential hero for a new age of safer nuclear energy."

EVERYDAY CONNECTION

Thorium is found in the mantle in an old gas-powered camping lantern.

POP CULTURE

Thorium is a potential fuel for a new generation of safer nuclear reactors.

Thorium: The Future of Nuclear Power

Thorium is a silvery, weakly radioactive metal named after Thor, the Norse god of thunder. It's much more common than uranium and is being explored as a potential cleaner and safer nuclear fuel for the future.

Why Is Thorium Useful?

Thorium's special properties make it valuable in several fields:

Nuclear Fuel: Thorium is a fertile material, meaning it can be converted into uranium-233, a fuel capable of sustaining nuclear reactions. Since thorium is about three times more abundant than uranium, countries like India and China are developing experimental thorium-based reactors as a possible future energy source.

Alloys: When mixed with magnesium, thorium produces light but strong alloys that can withstand very high temperatures. These were once used in aerospace and military applications.

Optical Lenses (Historic): Thorium dioxide was once added to camera and telescope lenses to improve image quality. However, safer non-radioactive alternatives are now used instead.

Industrial Catalyst: Thorium oxide is also used as a catalyst in certain industrial chemical reactions.

Biological Role & Natural Abundance

Thorium has no known biological role and is toxic due to its radioactivity.

It's fairly common in nature, found in small amounts in most rocks and soils. The main commercial source is the mineral monazite, which contains up to 12% thorium. Pure thorium metal is produced by reducing thorium oxide with calcium or by electrolyzing thorium fluoride.

History of Discovery

1829 – Discovery: Swedish chemist Jöns Jakob Berzelius discovered thorium while analyzing a mineral sample from Norway, later named thorite.

1898 – Radioactivity: German chemist Gerhard Schmidt and French physicist Marie Curie independently discovered thorium's radioactivity.

Thorium-232: This isotope has an astonishing half-life of 14 billion years, meaning it's still present on Earth today in large quantities.