Rhenium (Re)

Element 75 — Complete Summary

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75
Re
Rhenium
186.207

Key Properties

Atomic Mass	186.207
Category	Transition Metals
State at 20°C	solid
Melting Point	3185°C
Boiling Point	5590°C
Density	21.02
Electron Config	[Xe] 4f145d56s2
Electronegativity	1.9
Year Discovered	1925
Discovered By	Walter Noddack, Ida Tacke & Otto Berg

✨ Did You Know?

1. It was the last naturally occurring stable element to be discovered, in 1925.
2. It has the third-highest melting point of any element, after tungsten and carbon.
3. About 70% of the world's rhenium is used to make high-temperature superalloys for jet engine parts, like turbine blades.
4. It is one of the rarest elements in the Earth's crust; its average concentration is estimated at just one part per billion.
5. Its name comes from Rhenus, the Latin name for the Rhine river.

APPEARANCE
Rhenium is a dense, silvery-white, rare metal.

SUPERHERO PERSONA
"The Jet-Setter, a hero who allows jet engines to run hotter and more efficiently."

EVERYDAY CONNECTION
Rhenium is found in the turbine blades inside a commercial jet engine.

POP CULTURE
Rhenium was the last stable, naturally occurring element to be discovered.

Rhenium (Re): The Super-Tough, Super-Rare Metal

Rhenium is a shiny, silvery metal with one of the highest melting points of all elements—second only to tungsten. It is also one of the rarest elements in Earth’s crust, with only trace amounts found worldwide. Its name comes from Rhenus, the Latin word for the Rhine River.

Why Is Rhenium Useful?

Rhenium’s strength, heat resistance, and durability make it ideal for specialized, high-performance uses.

High-Performance Alloys: Most rhenium goes into nickel-based superalloys used in jet engine turbine blades and industrial gas turbines. These single-crystal blades resist heat and wear, allowing engines to run hotter, more efficiently, and for longer lifespans.

Filaments & Electrical Contacts: When added to tungsten or molybdenum alloys, rhenium improves their properties, making them perfect for oven filaments, X-ray machines, and electrical contacts that must withstand arcing and corrosion.

Catalysts: Rhenium is a powerful catalyst in the petroleum industry, where it helps make high-octane, lead-free gasoline and is also used for hydrogenating fine chemicals.

Natural Abundance & History

Rhenium is extremely rare—less than 1 part per billion in Earth’s crust. It is never found pure or in concentrated ores, but instead is obtained as a by-product of molybdenum smelting, collected from the flue dust during the refining process.

Predicted: Dmitri Mendeleev left a gap below manganese in his periodic table, suggesting rhenium should exist.

Discovery (1925): German chemists Walter Noddack and Ida Tacke isolated rhenium in Berlin. After processing 660 kg of molybdenite ore, they managed to extract just 1 gram of the metal.

Earlier Claim: In 1905, Japanese chemist Masataka Ogawa had actually detected rhenium in spectra, but he misidentified it as another element. His contribution was only recognized much later.

Biological Role

Rhenium has no known role in living organisms. Its health effects are not fully understood, so it is handled with caution.