Yttrium (Y)

Element 39 — Complete Summary

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39
Y
Yttrium
88.906

Key Properties

Atomic Mass	88.906
Category	Transition Metals
State at 20°C	solid
Melting Point	1522°C
Boiling Point	3345°C
Density	4.472
Electron Config	[Kr] 4d15s2
Electronegativity	1.22
Year Discovered	1794
Discovered By	Johan Gadolin

✨ Did You Know?

1. It is named after the village of Ytterby, Sweden. Incredibly, three other elements—terbium, erbium, and ytterbium—are also named after this same small village.
2. Yttrium was a critical component in producing the red color on old cathode-ray tube (CRT) television and computer screens.
3. Yttrium is used to make powerful lasers, such as YAG (yttrium-aluminium-garnet) lasers, which are used for cutting metal and in medical procedures.
4. It is often classified as a rare earth element due to its chemical similarities and its tendency to occur in the same mineral deposits.
5. When added to alloys, yttrium can significantly increase their strength and resistance to high-temperature corrosion.

👁 APPEARANCE
Yttrium is a silvery-white, lustrous metal.

🦸 SUPERHERO PERSONA
"The Red-Screen Ranger, the hero who created the bright red color on old TV screens."

🔗 EVERYDAY CONNECTION
Yttrium is found in the red phosphor in old cathode-ray tube television sets.

🎬 POP CULTURE
Yttrium is a common ﷺrare resourceﷺ needed for crafting advanced technology in video games.

Yttrium: The All-Purpose Rare Earth

Yttrium is a soft, silvery metal that belongs to the rare earth family. Its name comes from the Swedish village of Ytterby, a place famous for giving its name to several rare earth elements. Yttrium is best known for its role in alloys, lasers, electronics, and medicine.

Why Is Yttrium Useful?

Yttrium's usefulness comes from its ability to improve other materials and its optical and electronic properties:

Alloys: Adding yttrium to aluminum or magnesium alloys makes them stronger and more resistant to wear. It's also used in microwave filters for radar systems.

Lasers & Optics: Yttrium-aluminum garnet (YAG) is used to make powerful lasers that can cut through metal. Yttrium oxide is also added to camera lenses to make them more resistant to heat and shock. It's even used in white LED lights.

Superconductors: Yttrium compounds are used in high-temperature superconductors, materials that can conduct electricity with zero resistance.

Medicine: The radioactive isotope yttrium-90 is used in cancer treatments, especially for liver cancer.

Natural Abundance & History

Yttrium is never found as a pure metal in nature. Instead, it's found in minerals like xenotime, monazite, and bastnaesite. It's usually extracted by reducing yttrium fluoride with calcium.

1787 – Discovery of Yttria: A new "earth" (oxide) was found by Karl Arrhenius in a quarry in Ytterby, Sweden.

1794 – New Element Confirmed: Finnish chemist Johan Gadolin proved the oxide contained a new element, later named yttrium.

1828 – Pure Metal: German chemist Friedrich Wöhler was the first to isolate pure yttrium.

1843 – A Hidden Mixture: Swedish chemist Carl Mosander discovered that yttrium oxide actually contained other rare earths too—terbium and erbium—making Ytterby one of the richest sources of new elements in history.

Biological Role

Yttrium has no known role in the human body. Its soluble compounds are considered mildly toxic, so they must be handled with care.