



Key Properties

Atomic Mass	50.942
Category	Transition Metals
State at 20°C	solid
Melting Point	1910°C
Boiling Point	3407°C
Density	6.11
Electron Config	[Ar] 3d34s2
Electronegativity	1.63
Year Discovered	1801
Discovered By	Andrés Manuel del Río

Did You Know?

- 1 It was named after Vanadas, the Scandinavian goddess of beauty and fertility, because of the beautiful, vibrant colors of its chemical compounds.
- 2 The Model T Ford was famously durable partly because its chassis was made from a strong vanadium steel alloy.
- 3 Adding just a small amount of vanadium to steel can dramatically increase its strength, toughness, and heat resistance.
- 4 Some sea squirts and mushrooms accumulate very high concentrations of vanadium from their environment.
- 5 It is used as a catalyst in the production of sulfuric acid.

APPEARANCE

A hard, silvery-grey, ductile metal.

SUPERHERO PERSONA

"The Steel Strengthener, a hero who makes tools tough and unbreakable."

EVERYDAY CONNECTION

A durable wrench or screwdriver in a toolbox.

POP CULTURE

A key component in the fictional super-alloy Vibranium's matrix in the Marvel universe.

Vanadium: The Tough Metal of Alloys

Vanadium is a shiny, silvery metal that resists corrosion and is best known for making super-tough steel. Its name comes from Vanadis, the Norse goddess of beauty and fertility, because vanadium compounds can produce many bright, colorful chemicals.

Why Is Vanadium Useful?

Vanadium's strength lies in its ability to transform ordinary metals into super-strong alloys:

Steel Production: About 80% of vanadium goes into steel alloys. Adding even less than 1% makes steel much stronger and more shock-resistant. Vanadium steel is used for armor plating, tools, axles, and crankshafts.

Nuclear Reactors: Vanadium alloys are useful in nuclear reactors because they don't easily absorb neutrons, making them safer and more efficient.

Catalysts & Pigments: Vanadium(V) oxide is an important catalyst in chemical manufacturing and is also used as a pigment for coloring ceramics and glass. Vanadium compounds are even used to produce superconducting magnets.

Biological Role & Natural Abundance

Vanadium is an essential trace element—our bodies need only a tiny amount of it, but too much can be toxic.

It's found in about 65 different minerals, including vanadinite and carnotite, as well as in some iron ores and crude oils. Pure vanadium metal is made by reducing vanadium oxide with calcium in a special pressure vessel.

History of Discovery

Vanadium has the unusual honor of being discovered twice:

1801 – First Discovery: Spanish-Mexican chemist Andrés Manuel del Río identified a new element in a mineral he called brown lead. He sent samples to France, but other chemists mistakenly thought it was chromium.

1831 – Rediscovery: Swedish chemist Nils Gabriel Sefström rediscovered it in iron and proved it was a new element, giving it the name vanadium.

1869 – Pure Metal: English chemist Henry Roscoe finally produced pure vanadium, showing that earlier samples had been contaminated.