

# Neodymium (Nd)

Element 60 — Complete Summary  
theperiodictable.io



## Key Properties

Atomic Mass	144.242
Category	Lanthanides
State at 20°C	solid
Melting Point	1016°C
Boiling Point	3074°C
Density	7.01
Electron Config	[Xe] 4f46s2
Electronegativity	1.14
Year Discovered	1885
Discovered By	Carl Auer von Welsbach

## Did You Know?

- 1 Neodymium magnets are the STRONGEST permanent magnets known to humankind, capable of lifting objects thousands of times their own weight!
- 2 It wasn't until 1885 that Austrian chemist Carl Auer von Welsbach successfully isolated Neodymium, separating it from an element thought to be a single entity called 'didymium.'
- 3 Its name comes from the Greek words 'neos didymos,' meaning 'new twin,' because it was the 'new twin' to praseodymium, which it was separated from.
- 4 Neodymium is a 'rare earth' element, but don't let the name fool you! It's actually quite abundant in Earth's crust; the 'rarity' comes from how difficult it is to extract and process.
- 5 Tiny Neodymium magnets are packed into your earbuds and speakers, allowing for incredible sound quality from super small devices, thanks to their massive magnetic power.
- 6 Ever seen glass that changes color? Neodymium oxide is added to glass and ceramics to create stunning violet, purple, or even red colors, often shifting depending on the light source!
- 7 These powerful magnets are absolutely crucial for modern green technology, making electric vehicle motors more efficient and wind turbines generate more power.
- 8 Neodymium-doped YAG (Yttrium Aluminum Garnet) lasers, known as Nd:YAG lasers, are incredibly powerful and used in everything from industrial cutting and welding to eye surgery and tattoo removal!
- 9 Due to its strong reactivity with air, Neodymium metal tarnishes very quickly, turning purple-pink! That's why it's usually coated or sealed to protect its power.
- 10 Even though it's metallic, handling raw Neodymium is a no-go for magnet enthusiasts! It's brittle and can easily shatter into sharp pieces, making those super-strong magnets surprisingly fragile.

### APPEARANCE

A shiny, silvery metal that quickly tarnishes in air, blossoming into a captivating purplish-pink hue.

### SUPERHERO PERSONA

*"Neo-Dymium, master of magnetic forces and light manipulation, can focus energy into invisible fields or blazing laser beams, powering everything from your headphones to futuristic tech!"*

### EVERYDAY CONNECTION

The tiny, unseen powerhouse making your headphones boom, your phone vibrate, and your electric car zoom!

### POP CULTURE

Think lightsabers from Star Wars, high-tech MRI scanners, or the levitating gadgets in sci-fi movies – Neodymium is often the secret ingredient behind the magic!

## Neodymium: The Metal Behind Powerful Magnets

Neodymium is a silvery-white metal from the lanthanide family (often called rare earths). It tarnishes quickly when exposed to air. Its greatest claim to fame is being the key ingredient in the strongest permanent magnets we know of—magnets that power much of today's technology.

## Why Is Neodymium Useful?

Neodymium's main role is in neodymium-iron-boron (NdFeB) magnets, discovered in 1983. These magnets are extremely powerful yet inexpensive, allowing electronics to become smaller and more efficient. They're found in:

Mobile phones Loudspeakers and microphones Headphones Wind turbines and electric vehicles Car windscreen wipers

## Other important uses include:

Didymium Glass: Neodymium is part of special glass used in safety goggles for glassblowers and welders because it filters out the bright yellow flame.

Colored Glass: It gives glass beautiful tints—violet, wine-red, or gray—and is used in tanning lamps that let UV rays through while blocking heat.

Lasers: Neodymium glass lasers are used in eye and cosmetic surgery, and even to treat certain skin cancers.

## Natural Abundance & History

Neodymium never occurs in pure form in nature but is found in minerals such as monazite and bastnaesite. It's extracted from these ores using ion-exchange and solvent-extraction methods. Pure neodymium metal is obtained by reducing its chloride or fluoride with calcium.

Discovery (1885): Austrian chemist Karl Auer von Welsbach discovered that "didymium"—once thought to be a single element—was actually two. He split it into neodymium ("new twin") and praseodymium ("green twin") using spectroscopy.

First Pure Sample (1925): Scientists succeeded in producing pure neodymium metal for the first time.

### **Biological Role**

Neodymium has no known role in biology. It is considered moderately toxic and can irritate the eyes.