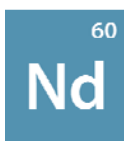


Stable isotopes of neodymium available from ISOFLEX

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Enrichment Level	Chemical Form
Nd-142	60	82	141.907719	27.13%	>97.50%	Oxide
Nd-143	60	83	142.909810	12.18%	≥79.00%	Oxide
Nd-144	60	84	143.910083	23.80%	>98.50%	Oxide
Nd-145	60	85	144.912569	8.30%	≥94.00%	Oxide
Nd-146	60	86	145.913113	17.19%	≥98.80%	Oxide
Nd-148	60	88	147.916889	5.76%	≥97.40%	Oxide
Nd-150	60	90	149.920887	5.64%	≥97.60%	Oxide



Neodymium was discovered in 1885 by Carl F. Auer von Welsbach. Its name derives from the Greek phrase *neos didymos*, meaning “new twin.”

Neodymium is a silvery-white, soft, malleable metal that tarnishes easily. It liberates hydrogen from water and is soluble in dilute acids. It has a high electrical resistivity and is paramagnetic. It is readily cut and machined. It exists in two allotropic forms: an *alpha hexagonal form*, and a *beta form* that has body-centered cubic crystal structure. The alpha allotrope converts to beta modification at 868 °C. Neodymium corrodes slowly in dry atmosphere at ambient temperatures; however, in moist air, the rate of oxidation is faster, forming a hydrated oxide. Neodymium combines with many nonmetallic elements — including hydrogen, nitrogen, carbon, phosphorus and sulfur — at elevated temperatures, forming their binary compounds. The metal dissolves in dilute mineral acids, but concentrated sulfuric acid has little action on it. Neodymium is a moderately strong reducing agent. It reduces several metal oxides — such as magnesia, alumina, silica and zirconia — at elevated temperatures, converting these oxides to their metals.

The pure metal has very little commercial application; however, neodymium in the form of alloys has found some important but limited applications in metallurgy. It is added to cast iron, magnesium, aluminum, zirconium and titanium alloys, imparting high-temperature strength and creep resistance to these alloys. It acts as a “getter” for oxygen, sulfur, hydrogen, nitrogen and other elements. Small quantities of neodymium salts are used as a coloring agent for glass and porcelain, imparting a red color.

Properties of Neodymium

Name	Neodymium
Symbol	Nd
Atomic number	60
Atomic weight	144.24
Standard state	Solid at 298 °K
CAS Registry ID	7440-00-8
Group in periodic table	N/A
Group name	Lanthanoid
Period in periodic table	6 (Lanthanoid)
Block in periodic table	f-block
Color	Silvery white, yellowish tinge
Classification	Metallic
Melting point	1024 °C
Boiling point	3068 °C
Vaporization point	3027 °C
Thermal conductivity	16.5 W/(m·K) at 298.2 °K
Electrical resistivity	65 x 10 ⁻⁶ Ω·cm at 25 °C
Electronegativity	1.2
Specific heat	190 kJ/kg K
Heat of vaporization	285 kJ·mol ⁻¹ at 3068 °C
Heat of fusion	7.1 kJ·mol ⁻¹
Density of liquid	6.89 g/cm ³ at 1024 °C
Density of solid	6.80-7.01 g/cm ³
Electron configuration	[Xe]4f ³ 4d ¹ 6s ²
Atomic volume	20.60 cm ³ /mol
Most common oxidation state	+3
Other oxidation state	+2
Standard electrode potential	Nd ³⁺ : 0.995 Å
Ionization potential	6.31 eV