

Nickel ${}_{28}\text{Ni}^{58.71}$

Discovered in 1751 by A.F. Cronstedt at Stockholm, Sweden.

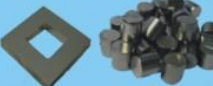
[German, comes from kupfernickel meaning either Devil's copper or St. Nichola's copper]

French: nickel

German: nickel

Italian: nichel

Spanish: niquel

28	58.693
Ni	
	
Nickel	
8.902	1453
124.6	2732

Atomic number	28
Density in g/cm ³	8.902
Atomic radius in pm	149
Atomic weight	58.693
Melting point in °C	1453
Boiling point in °C	2732

Description: Nickel is a silvery-white, lustrous, malleable and ductile metal. It resists corrosion, but is soluble in acids (except HNO₃), yet unaffected by alkalis. It is used in alloys, especially stainless steel, in coins, metal plating, and catalysts.

NICKEL SINGLE CRYSTAL PROPERTIES

State:	single crystal
Crystal structure:	fcc
Production method:	Czochralski
Standard size:	diameter 10-20mm thickness 1-2mm
Orientation:	(100), (110) and (111)
Orientation accuracy:	<2°, <1°, <0.4° or <0.1°
Polishing:	as cut, one or two sides polished
Roughness of surface:	<0.03µm
Purity:	99.99%
	C 3
	H < 1
	O 9
	N < 5
	Cu 1.60
	Fe 1.80
	Ni < 1
	Pb 0.30
	Si 0.30
	Ga, Hf and Ta are below the detection limit
Density:	8.9 g/cm ³
Melting point:	1452.85 °C / 1726 °K
Boiling point:	2731.85 °C / 3005 °K
Molar volume:	6.59 cm ³
Thermal conductivity:	90.7 [300 K] Wm ⁻¹ K ⁻¹

Typical analysis (ppm):



Coefficient of linear thermal expansion:	13.3 x 10 ⁻⁶ K ⁻¹
Electrical resistivity:	6.84x 10 ⁻⁸ [293 K] Wm
Mass magnetic susceptibility:	ferromagnetic
Young's modulus:	199.5 GPa
Rigidity modulus:	76.0 GPa
Bulk modulus:	177.3 GPa
Poisson's ratio:	0.312
Radii:	Ni ³⁺ 62; Ni ²⁺ 78; atomic 125; covalent 115
Electronegativity:	1.91 (Pauling); 1.75 (Allred); 4.40 eV (absolute)
Effective nuclear charge:	4.05 (Slater); 5.71 (Clementi); 7.86 (Froese-Fischer)
Number of Isotopes (incl. nuclear isomers):	14
Isotope mass range:	53 -> 67
Crystal structure, (cell dimensions / pm), space group	fcc
X-ray diffraction: mass absorption coefficients:	CuK α 45.7 (μ/r) / cm ² g ⁻¹ MoK α 46.6 (μ/r) / cm ² g ⁻¹
Neutron scattering length:	1.03 b/10 ⁻¹² cm
Thermal neutron capture cross-section:	4.49 sa / barns

