

OVERVIEW

Full Name	Niobium (Columbium)
Symbol	Nb
Atomic Number	41
Series	Transition Metal
Block / Group / Period	d-block Group 5 Period 5
Electron Config.	[Kr]5s14d4
Phase at STP	Solid
Colour	Gray
Discovery	1801 in The United Kingdom

THERMAL PROPERTIES

Melting Point	2477 °C	°C
Melting Point (abs.)	2750 K	K
Boiling Point	4744 °C	°C
Boiling Point (abs.)	5017 K	K
Heat of Fusion	26.8 kJ/mol	kJ/mol
Heat of Vaporization	690 kJ/mol	kJ/mol
Specific Heat (solid)	265 J/(kg K)	J/(kg·K)
Thermal Conductivity	54 W/(m K)	W/(m·K)
Thermal Expansion	7.3×10⁻⁶ K⁻¹	K ⁻¹

MECHANICAL PROPERTIES

Density (solid, STP)	8.57 g/cm³	g/cm ³
Young's Modulus	105 GPa	GPa
Shear Modulus	38 GPa	GPa
Bulk Modulus	170 GPa	GPa
Poisson's Ratio	0.4	
Speed of Sound	3480 m/s	m/s
Mohs Hardness	6	
Vickers Hardness	1320 MPa	MPa
Brinell Hardness	736 MPa	MPa

ELECTRICAL PROPERTIES

Type	Conductor	
Conductivity	6.7×10⁶ S/m	S/m
Resistivity	1.5×10⁻⁷ m ?	Ohm·m
Superconducting Pt.	9.25	K

MAGNETIC PROPERTIES

Type	Paramagnetic	
Vol. Susceptibility	0.000237	
Mass Susceptibility	2.76×10⁻⁸ m³/Kg	m ³ /kg

REACTIVITY

Valence	5	
Electronegativity	1.6	(Pauling)
Electron Affinity	86.1 kJ/mol	kJ/mol
Ionization Energies	652.1, 1380	kJ/mol

ATOMIC DIMENSIONS

Atomic Radius	198 pm	pm
Covalent Radius	164 pm	pm

CRYSTAL STRUCTURE

Structure	Body-centered Cubic	
Lattice Constant	330.04, 330.04, 330.04 pm	
Space Group	Im_3m	#229

ISOTOPES & NUCLEAR

Stability	Stable	
Stable Isotopes	93Nb	
Isotopic Abundance	93Nb100%	
Known Isotopes	81Nb ■ 113Nb (33 total)	
Neutron Cross Sect.	1.15	barns

ELEMENTAL ABUNDANCES

Universe	2×10⁻⁷%	%
Earth's Crust	0.0017%	%
Oceans	1×10⁻¹⁰%	%

HEALTH & SAFETY

RTECS Number	QT9900000
NFPA Health/Fire/Rx	0 / 0 / 0