

OVERVIEW	
Full Name	Zirconium (None)
Symbol	Zr
Atomic Number	40
Series	Transition Metal
Block / Group / Period	d-block Group 4 Period 5
Electron Config.	[Kr]5s24d2
Phase at STP	Solid
Colour	Silver
Discovery	1789 in Germany

THERMAL PROPERTIES		
Melting Point	1855 °C	°C
Melting Point (abs.)	2128 K	K
Boiling Point	4409 °C	°C
Boiling Point (abs.)	4682 K	K
Heat of Fusion	21 kJ/mol	kJ/mol
Heat of Vaporization	580 kJ/mol	kJ/mol
Specific Heat (solid)	278 J/(kg K)	J/(kg·K)
Thermal Conductivity	23 W/(m K)	W/(m·K)
Thermal Expansion	5.7×10 ⁻⁶ K ⁻¹	K ⁻¹

MECHANICAL PROPERTIES		
Density (solid, STP)	6.511 g/cm ³	g/cm ³
Density (liquid, MP)	5.8 g/cm ³	g/cm ³
Young's Modulus	67 GPa	GPa
Shear Modulus	33 GPa	GPa
Poisson's Ratio	0.34	
Speed of Sound	3800 m/s	m/s
Mohs Hardness	5	
Vickers Hardness	904 MPa	MPa
Brinell Hardness	650 MPa	MPa

ELECTRICAL PROPERTIES		
Type	Conductor	
Conductivity	2.4×10 ⁶ S/m	S/m
Resistivity	4.2×10 ⁻⁷ m ?	Ohm·m
Superconducting Pt.	0.61	K

MAGNETIC PROPERTIES		
Type	Paramagnetic	
Vol. Susceptibility	0.000109	
Mass Susceptibility	1.68×10 ⁻⁸ m ³ /Kg	m ³ /kg

REACTIVITY		
Valence	4	
Electronegativity	1.33	(Pauling)
Electron Affinity	41.1 kJ/mol	kJ/mol
Ionization Energies	640.1, 1270	kJ/mol

ATOMIC DIMENSIONS		
Atomic Radius	206 pm	pm
Covalent Radius	175 pm	pm

CRYSTAL STRUCTURE		
Structure	Simple Hexagonal	
Lattice Constant	323.2, 323.2, 514.7 pm pm	
Space Group	P63/mmc	#194

ISOTOPES & NUCLEAR		
Stability	Stable	
Stable Isotopes	90Zr, 91Zr, 92Zr, 94Zr	
Isotopic Abundance	90Zr51.45%91Zr11.22%92Zr17.15%94...	
Known Isotopes	78Zr ■ 110Zr (33 total)	
Neutron Cross Sect.	0.184	barns

ELEMENTAL ABUNDANCES		
Universe	5×10 ⁻⁶ %	%
Earth's Crust	0.013%	%
Oceans	2.6×10 ⁻⁹ %	%
Human Body	5×10 ⁻⁶ %	%

HEALTH & SAFETY		
DOT Hazard Class	4.2	
NFPA Health/Fire/Rx	0 / 0 / 0	