

Yttrium ${}_{39}\text{Y}^{88.906}$

Discovered in 1794 by J. Gadolin at Åbo, Finland.

[Named after Ytterby, Sweden]

French: yttrium

German: Yttrium

Italian: ittrio

Spanish: ytrio



Atomic number	39
Density in g/cm ³	4.472
Atomic radius in pm	212
Atomic weight	88.906
Melting point in °C	1522
Boiling point in °C	3338

Description: Yttrium is a soft, silvery-white metal that is stable in air due to the formation of an oxide film on its surface. It burns if ignited, and is attacked by water and forms hydrogen. Yttrium is used in various ways: to give red colours in TV screens, in X-ray filters, superconductors and for superalloys.

YTTRIUM SINGLE CRYSTAL PROPERTIES

State:	single crystal
Crystal structure:	hexagonal
Production method:	Floating zone
Standard size:	diameter 4mm thickness 1mm
Orientation:	(0001)
Orientation accuracy:	<2°, <1°, <0.4° or <0.1°
Polishing:	as cut, one or two sides polished
Roughness of surface:	<0.03µm
Purity:	99.95%
	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:	4.47 g/cm ³
Melting point:	1521.85 °C / 1795 °K
Boiling point:	3337.85 °C / 3611 °K
Molar volume:	19.89 cm ³
Thermal conductivity:	17.2 [300 K] Wm ⁻¹ K ⁻¹
Coefficient of linear thermal expansion:	10.6 x 10 ⁻⁶ K ⁻¹

Typical analysis (ppm):

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Electrical resistivity:	57.0x 10 ⁻⁸ [298 K] Wm
Mass magnetic susceptibility:	+2.70 x 10 ⁻⁸ (s) kg ⁻¹ m ³
Young's modulus:	66.3 GPa
Rigidity modulus:	25.5 GPa
Bulk modulus:	n.a. GPa
Poisson's ratio:	0.265
Radii:	Y3+ 106; atomic 181; covalent 162
Electronegativity:	1.22 (Pauling); 1.11 (Allred); 3.19 eV (absolute)
Effective nuclear charge:	3.00 (Slater); 6.26 (Clementi); 8.72 (Froese-Fischer)
Number of Isotopes (incl. nuclear isomers):	32
Isotope mass range:	80 -> 99
Crystal structure, (cell dimensions / pm), space group	hexagonal
X-ray diffraction: mass absorption coefficients:	CuKα 134 (μ/r) / cm ² g ⁻¹ MoKα 100 (μ/r) / cm ² g ⁻¹
Neutron scattering length:	0.775 b/10 ⁻¹² cm
Thermal neutron capture cross-section:	1.28 sa / barns

