

Tungsten ${}_{74}\text{W}^{183.85}$

Discovered in 1783 by J.J. and F. Elhujjar at Vergara, Spain.

[Swedish, tung sten = heavy stone; wolfram is named after wolframite]

French: tungstène

German: Wolfram

Italian: wolframio (tungsteno)

Spanish: wolframio



Atomic number	74
Density in g/cm ³	19.25
Atomic radius in pm	193
Atomic weight	183.84
Melting point in °C	3410
Boiling point in °C	5657

Description: Tungsten is generally obtained as a dull grey powder, which is difficult to melt. The bulk metal is lustrous and silvery-white, and resists attack by oxygen, acids and alkalis. Tungsten is used in alloys, to which it imparts great strength, in light bulb filaments and cutting tools.

TUNGSTEN SINGLE CRYSTAL PROPERTIES

State:	single crystal
Crystal structure:	bcc
Production method:	Floating zone
Standard size:	diameter 8-12mm 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:	99.999%
	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:	19.3 g/cm ³
Melting point:	3406.85±20 °C / 3680±20 °K
Boiling point:	5656.85 °C / 5930 °K
Molar volume:	9.53 cm ³

Typical analysis (ppm):

www.princetonscientific.com

Tel. (609) 9243011 | Fax (609) 9243018 | info@princetonscientific.com | P.O. Box 148 · Easton, PA 18044



Thermal conductivity:	174 [300 K] Wm ⁻¹ K ⁻¹
Coefficient of linear thermal expansion:	4.59 x 10 ⁻⁶ K ⁻¹
Electrical resistivity:	5.65x 10 ⁻⁸ [300 K] Wm
Mass magnetic susceptibility:	+4.0 x 10 ⁻⁹ (s) kg ⁻¹ m ³
Young's modulus:	411 GPa
Rigidity modulus:	160.6 GPa
Bulk modulus:	311 GPa
Poisson's ratio:	0.28
Radii:	W6+ 62; W4+ 68; atomic 137; covalent 130
Electronegativity:	2.36 (Pauling); 1.40 (Allred); 4.40 eV (absolute)
Effective nuclear charge:	4.35 (Slater); 9.85 (Clementi); 14.22 (Froese-Fischer)
Number of Isotopes (incl. nuclear isomers):	29
Isotope mass range:	160 -> 190
Crystal structure, (cell dimensions / pm), space group	bcc
X-ray diffraction: mass absorption coefficients:	CuK α 172 (μ/r) / cm ² g ⁻¹ MoK α 99.1 (μ/r) / cm ² g ⁻¹
Neutron scattering length:	0.486 b/10 ⁻¹² cm
Thermal neutron capture cross-section:	18.3 sa / barns

