

Chromium ${}_{24}\text{Cr}^{51.996}$

Discovered and isolated in 1780 by Nicholas Louis Vauquelin at Paris, France.

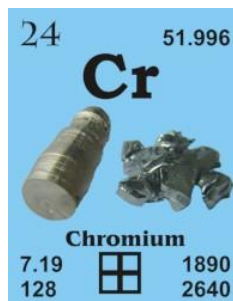
[Greek: chroma = colour]

French: chrome

German: chrom

Italian: cromo

Spanish: cromo



Atomic number	24
Density in g/cm ³	7.19
Atomic radius in pm	166
Atomic weight	51.996
Melting point in °C	1907
Boiling point in °C	2640

Description: Chromium is a hard, blue-white metal. It will dissolve in HCl and H₂SO₄ but not HNO₃, H₂PO or HClO₄ due to reaction and formation of a protective layer on the surface. Chromium can be polished to a high shine and resists oxidation in air. Its main uses are in alloys, chrome plating and metal ceramics.

CHROMIUM SINGLE CRYSTAL PROPERTIES

State:	Single crystal
Crystal structure:	bcc
Production method:	Floating zone
Standard size:	diameter 6-10mm thickness 1-2mm
Orientation:	(100), (110) and (111)
Orientation accuracy:	<2°, <1°, <0.4° or <0.1d°
Polishing:	as cut, one or two sides polished
Roughness of surface:	<0.03 μm
Purity:	99.999%
	Ag < 0.10
	C 10.0
	Ca 0.01
	Cd < 0.10
	Cl 1.60
	Co < 0.10
	Cu < 0.10
	Fe 18.0
	H < 2.00
	Mg < 0.10
	Mn < 0.10
	Mo < 0.20

Typical analysis (ppm):



	N < 5.00
	Na < 0.10
	Ni 3.00
	O < 5.00
	Si 4.80
	Cr balance
Crystal structure:	(cell dimensions/pm), space group, b.c.c. (a=288.46), Im3m
X-ray diffractions mass absorption coefficients:	CuK α 260 ($\mu/\text{cm}^2\text{g}^{-1}$) MoK α 31.1 ($\mu/\text{cm}^2\text{g}^{-1}$)
Neutron scattering length:	0.3635 b/10 ⁻¹² cm
Thermal neutron capture cross-section:	3.1 μa / barns
Density:	7.19 kg/m ⁻³
Melting point:	1856.85 \pm 20 $^{\circ}\text{C}$ / 2130 \pm 20 $^{\circ}\text{K}$
Boiling point:	2671.85 $^{\circ}\text{C}$ / 2945 $^{\circ}\text{K}$
Molar volume:	7.23 cm ³
Thermal conductivity:	93.7 [300 K] Wm ⁻¹ K ⁻¹
Coefficient of linear thermal expansion:	6.2 x 10 ⁻⁶ K ⁻¹
Electrical resistivity:	12.7 x 10 ⁻⁸ [293 K] Ωm
Mass magnetic susceptibility:	+4.45 x 10 ⁻⁹ (s) kg ⁻¹ m ³
Young's modulus:	279 GPa
Rigidity modulus:	115.3 GPa
Bulk modulus:	160.2 GPa
Poisson's ratio:	0.21
Radi:	Cr4+ 56; Cr3+ 64; Cr2+ 84; atomic 1253
Electronegativity:	1.66 (Pauling); 1.56 (Allred); 3.72 eV (absolute)
Effective nuclear charge:	3.45 (Slater); 5.13 (Clementi); 6.92 (Froese-Fischer)
Number of Isotopes (incl. nuclear isomers):	13
Isotope mass range:	45 -> 57

