

Aluminium ${}_{13}\text{Al}^{26.9815}$

Discovered in 1825 by Ørsted at Copenhagen, Denmark.

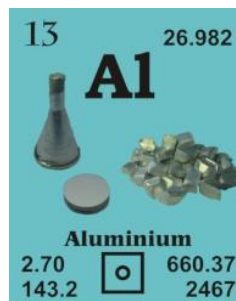
[Latin: alumen = alum]

French: aluminium

German: aluminium

Italian: alluminio

Spanish: aluminio



Atomic number	13
Density in g/cm ³	2.7
Atomic radius in pm	118
Atomic weight in u	26.982
Melting point in °C	660.37
Boiling point in °C	2467

Description: Pure aluminium is soft and malleable, but can be toughened by alloying with small amounts of other metals like copper and magnesium. Aluminium objects are protected from reacting with air and water by an oxide film which forms rapidly on the surface.

Aluminium is soluble in concentrated hydrochloric acid and in sodium hydroxide solution. The metal and its alloys have hundreds of uses in the vehicle, aircraft, and construction industries. It is used to make cans kegs, wrapping foil, household utensils, etc.

ALUMINIUM SINGLE CRYSTAL PROPERTIES

State:	Single crystal	
Crystal structure:	fcc	
Production method:	Bridgman or Czochralski	
Standard size:	diameter 12-20mm 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:	<0.03 µm	
Purity:	99.9999%	
Typical analysis (ppm):	Ag < 0.005	Mg 0.403
	As < 0.2	Mn 0.025
	B < 0.005	Mo < 0.2
	Ba < 0.1	Na 0.014
	Be < 0.005	Ni < 0.005
	Bi < 0.005	O < 10
	Ca < 0.050	P 0.049
	Ce < 1.0	Pb < 0.005
	Cl < 1.0	Pd < 0.5
	Co < 0.1	Pt < 0.5
	Cr 0.009	S < 0.9
	Cs < 0.5	Sb < 0.005



Cu < 0.4	Si 0.223
F < 0.9	Sn < 0.2
Fe 0.163	Th 1.9 ppb
Ga < 0.005	Ti 0.016
Ge < 0.5	U 0.9 ppb
In < 0.005	V 0.006
K < 0.1	W < 0.5
La < 0.5	Zn 0.024
Li < 0.1	Zr 0.005
	Al balance

Crystal structure:	(cell dimensions/pm), space group, fcc (a = 404.959), Fm3m
X-ray diffractions mass absorption coefficients:	CuKa 48.6 (μ/r) / cm ² g ⁻¹ MoKa 5.16 (μ/r) / cm ² g ⁻¹
Neutron scattering length:	0.3449 b/10 ⁻¹² cm
Thermal neutron capture cross-section:	0.231 sa / barns
Density:	2698 kg/m ⁻³ [293 K]; 2390 [liquid at m.p.]
Melting point:	660.37 °C / 933.52 °K
Boiling point:	2466.85 °C / 2740 °K
Molar volume:	10.00 cm ³
Thermal conductivity:	237 [300 K] Wm ⁻¹ K ⁻¹
Coefficient of linear thermal expansion:	23.03 x 10 ⁻⁶ K ⁻¹
Electrical resistivity:	2.6548x10 ⁻⁸ [293 K] Wm
Mass magnetic susceptibility:	+7.7 x 10 ⁻⁹ (s) kg ⁻¹ m ³
Young's modulus:	70.6 GPa
Rigidity modulus:	26.2 GPa
Bulk modulus:	75.2 GPa
Poisson's ratio:	0.345
Radi:	Al ³⁺ 57; atomic 143; covalent 125; van der Waals 205
Electronegativity:	1.61 (Pauling); 1.47 (Allred); 3.23 eV (absolute)
Effective nuclear charge:	3.50 (Slater); 4.07 (Clementi); 3.64 (Froese-Fischer)
Number of Isotopes (incl. nuclear isomers):	11
Isotope mass range:	22 -> 31

