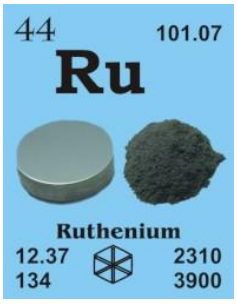
Ruthenium $_{44}Ru^{101.07}$



Atomic number	44
Density in g/cm³	12.37
Atomic radius in pm	178
Atomic weight	101.07
Melting point in °C	2310
Boiling point in °C	3900

Ruthenium was discovered in 1808 by J.A. Sniadecki at the University of Vilno, Poland. Rediscovered in 1828 by G.W. Osann at the University of Tartu, Russia.

[Latin, Ruthenia = Russia]
French: ruthenium
German: Ruthenium
Italian: rutenio
Spanish: rutenio

Description: Ruthenium is a lustrous, silvery metal of the so-called platinum group. It is unaffected by air, water and acids, but dissolves in molten alkalis. Ruthenium is used to harden platinum an palladium metals, and as a catalyst.

RUTHENIUM SINGLE CRYSTAL PROPERTIES

State:	single crystal
Crystal structure:	hexagonal
Production method:	Floating zone
Standard size:	diameter 6-8mm thickness 1-2mm
Orientation:	(0001), (+1-100) and (11-20)
Orientation accuracy:	<2°, <1°, <0.4° or <0.1°
Polishing:	as cut, one or two sides polished
Roughness of surface:	<0.03µm
Purity:	99.99%
Typical analysis (ppm):	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:	12.2 g/cm3
Melting point:	2309.85 °C / 2583 °K
Boiling point:	3899.85 °C / 4173 °K
Molar volume:	8.14 cm3
Thermal conductivity:	117 [300 K] Wm-1K-1

Coefficient of linear thermal expansion:	9.1 x 10-6 K-1
Electrical resistivity:	7.6x 10-8 [273 K] Wm
Mass magnetic susceptibility:	+5.37 x 10-9(s) kg-1m3
Young's modulus:	432 GPa
Rigidity modulus:	173 GPa
Bulk modulus:	286 GPa
Poisson's ratio:	0.25
Radii:	Ru5+ 54; Ru4+ 65; Ru3+ 77; atomic 134; covalent 12
Electronegativity:	2.2 (Pauling); 1.42 (Allred); 4.5 eV (absolute)
Effective nuclear charge:	3.75 (Slater); 7.45 (Clementi); 10.57 (Froese-Fischer)
Number of Isotopes (incl. nuclear isomers):	20
Issotope mass range:	92 -> 110
Crystal structure, (cell dimentions / pm), space group	hexagonal
X-ray diffraction: mass absorption coefficients:	CuKα 183 (μ/r) / cm2g-1 MoKα 21.1 (μ/r) / cm2g-1
Neutron scattering length:	0.721 b/10-12 cm
Thermal neutron capture cross-section:	2.56 sa / barns