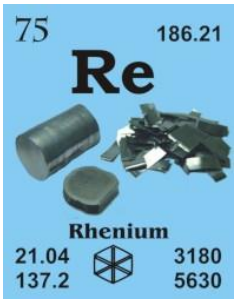
# Rhenium $_{75}Re^{186.2}$

Discovered in 1925 by W. Noddack, Ida Tacke and O. Berg at Berlin, Germany.

[Greek, Rhenus = river Rhine]
French: Rhénium
German: Rhenium
Italian: Renio
Spanish: Renio




| | |
|---|---|
| Atomic number | 75 |
| Density in g/cm³ | 21.04 |
| Atomic radius in pm | 188 |
| Atomic weight | 186.21 |
| Melting point in °C | 3180 |
| Boiling point in °C | 5630 |

**Description:** Rhenium is a silvery metal, but is usually obtained as a grey powder. It resists corrosion but slowly tarnishes in moist air. Rhenium dissolves in HNO3 an H2SO4. It is used in filaments, thermistors and catalysts.

## RHENIUM SINGLE CRYSTAL PROPERTIES

| | |
|---|---|
| **State:** | Single crystal |
| **Crystal structure:** | hexagonal |
| **Production method:** | Floating zone |
| **Standard size:** | diameter 6mm<br>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<br>H < 1<br>O 9<br>N < 5<br>Cu 1.60<br>Fe 1.80<br>Ni < 1<br>Pb 0.30<br>Si 0.30<br>Ga, Hf and Ta are below the detection limit |
| **Density:** | 12.4 g/cm3 |
| **Melting point:** | 3179.85 °C / 3453 °K |
| **Boiling point:** | 5626.85 °C / 5900 °K |
| **Molar volume:** | 8.86 cm3 |
| **Thermal conductivity:** | 47.9 [300 K] Wm-1K-1 |
| **Coefficient of linear thermal expansion:** | 6.63 x 10-6 K-1 |

| | |
|---|---|
| **Electrical resistivity:** | 19.3x 10-8 [293 K] Wm |
| **Mass magnetic susceptibility:** | +4.56 x 10-9(s) kg-1m3 |
| **Young's modulus:** | 466 GPa |
| **Rigidity modulus:** | 181 GPa |
| **Bulk modulus:** | 334 GPa |
| **Poisson's ratio:** | 0.26 |
| **Radii:** | Re7+ 60; Re6+ 61; Re4+ 72; atomic 137; covalent 12 |
| **Electronegativity:** | 1.9 (Pauling); 1.46 (Allred); 4.02 eV (absolute) |
| **Effective nuclear charge:** | 3.60 (Slater); 10.12 (Clementi); 14.62 (Froese-Fischer) |
| **Number of Isotopes (incl. nuclear isomers):** | 34 |
| **Issotope mass range:** | 162 -> 192 |
| **Crystal structure, (cell dimentions / pm), space group** | hexagonal |
| **X-ray diffraction: mass absorption coefficients:** | CuKα 179 (μ/r) / cm2g-1<br>MoKα 103 (μ/r) / cm2g-1 |
| **Neutron scattering length:** | 0.92 b/10-12 cm |
| **Thermal neutron capture cross-section:** | 89.7 sa / barns |