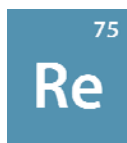


Stable isotopes of rhenium available from ISOFLEX

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Enrichment Level	Chemical Form
Re-185	75	110	184.952955	37.40%	93.00-96.80%	Metal
Re-187	75	112	186.955750	62.60%	>99.00%	Metal



Rhenium was discovered in 1925 by Walter Noddack, Ida Tacke and Otto Berg. Its name derives from the Greek name *Rhenus*, meaning “River Rhine.”

A silver-white solid or gray-to-black powder, rhenium has a hexagonal crystal system, which it retains all the way to its melting point. It has the widest range of valences of any element. It is insoluble in water, practically insoluble in hydrochloric acid, soluble in dilute nitric acid and hydrogen peroxide, and slightly soluble in sulfuric acid. It is not attacked by sea water, hydrochloric acid, cold sulfuric or hydrofluoric acids. It is attacked by strong oxidizing agents (nitric and sulfuric acids). In compact or massive form, it is stable at ordinary temperatures. Rhenium reacts with all halogens, including iodine, to yield halides in several valence states. However, oxidizing acids — such as nitric acid or hot sulfuric acid — vigorously react with the metal, forming perrhenic acid. Rhenium combines with phosphorus, arsenic, silicon, selenium and tellurium at elevated temperatures, forming binary compounds. The metal, however, is stable in hydrogen and nitrogen at high temperatures.

Rhenium is used in tungsten- and molybdenum-based alloys. It is used for filaments for ion gauges in mass spectrometers. Rhenium-tungsten alloys are used in thermocouples to measure temperatures up to 2200 °C. Rhenium wire is used in flash bulbs for photography. Rhenium compounds also are used as catalysts in hydrogenation and hydrofracking reactions in petroleum refining.

Properties of Rhenium

Name	Rhenium
Symbol	Re
Atomic number	75
Atomic weight	186.21
Standard state	Solid at 298 °K
CAS Registry ID	7440-15-5

Properties of Rhenium (continued)

Group in periodic table	7
Group name	None
Period in periodic table	6
Block in periodic table	d-block
Color	Grayish white
Classification	Metallic
Melting point	3180 °C
Boiling point	5627 °C
Vaporization point	5627 °C
Thermal conductivity	48.0 W/(m·K) at 298.2 °K
Electrical resistivity	19.14 $\mu\Omega\cdot\text{cm}$ at 20 °C
Electronegativity	1.9
Specific heat	0.14 kJ/kg K
Heat of vaporization	705 kJ·mol ⁻¹
Heat of fusion	33 kJ·mol ⁻¹
Density of liquid	18.9 g/cm ³ at 3180 °C
Density of solid	20.53 g/cm ³
Electron configuration	[Xe]4f ¹⁴ 5d ⁵ 6s ²
Oxidation states	-1, +1, +2, +3, +4, +5, +6, +7
Most common oxidation state	+7