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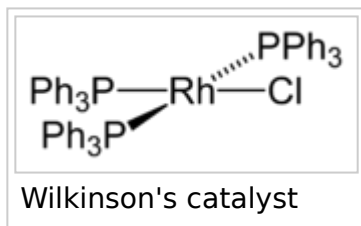
Rhodium is a noble metal, resistant to corrosion, found in platinum or nickel ores together with the other members of the platinum group metals. It was discovered in 1803 by William Hyde Wollaston in one such ore, and named for the rose color of one of its chlorine compounds, produced after it reacted with the powerful acid mixture aqua regia.

Rhodium detectors are used in nuclear reactors to measure the neutron flux level.

Rhodium is a hard, silvery, durable metal that has a high reflectance. Rhodium metal does not normally form an oxide, even when heated.^[17] Oxygen is absorbed from the atmosphere only at the melting point of rhodium, but is released on solidification.^[18] Rhodium has both a higher melting point and lower density than platinum. It is not attacked by most acids: it is completely insoluble in nitric acid and dissolves slightly in aqua regia.

Phase	solid
Melting point	2237 K (1964 °C, 3567 °F)
Boiling point	3968 K (3695 °C, 6683 °F)
Density near r.t.	12.41 g/cm ³

Chemical properties



Rhodium belongs to group 9 of the periodic table, but the configuration of electrons in the outermost shells is atypical for the group. This anomaly is also observed in the neighboring elements, niobium (41), ruthenium (44), and palladium (46).

The common oxidation state of rhodium is +3, but oxidation states from +0 to +6 are also observed.^[19]

Unlike ruthenium and osmium, rhodium forms no volatile oxygen compounds. The known stable oxides include Rh_2O_3 , RhO_2 , $\text{RhO}_2 \cdot x\text{H}_2\text{O}$, Na_2RhO_3 , $\text{Sr}_3\text{LiRhO}_6$ and $\text{Sr}_3\text{NaRhO}_6$.^[20] Halogen compounds are known in nearly the full range of possible oxidation states. Rhodium(III) chloride, rhodium(IV) fluoride, rhodium(V) fluoride and rhodium(VI) fluoride are examples. The lower oxidation states are stable only in the presence of ligands.^[21]

The best-known rhodium-halogen compound is the Wilkinson's catalyst chlorotris(triphenylphosphine)rhodium(I). This catalyst is used in the hydroformylation or hydrogenation of alkenes.^[22]

Isotopes

Naturally occurring rhodium is composed of only one isotope, ^{103}Rh . The most stable radioisotopes are ^{101}Rh with a half-life of 3.3 years, ^{102}Rh with a half-life of 207 days, $^{102\text{m}}\text{Rh}$ with a half-life of 2.9 years, and ^{99}Rh with a half-life of 16.1 days. Twenty other radioisotopes have been characterized with atomic weights ranging from 92.926 u (^{93}Rh) to 116.925 u (^{117}Rh). Most of these have half-lives shorter than an hour, except ^{100}Rh (20.8 hours) and ^{105}Rh (35.36 hours). It has numerous meta states, the most stable being $^{102\text{m}}\text{Rh}$ (0.141 MeV) with a half-life of about 2.9 years and $^{101\text{m}}\text{Rh}$ (0.157 MeV) with a half-life of 4.34 days (see isotopes of rhodium).^[23]

when liquid, at m.p. 10.7 g/cm³

Heat of fusion 26.59 kJ/mol

Heat of vaporization 493 kJ/mol

Molar heat capacity 24.98 J/(mol·K)

Vapor pressure

P (Pa)	1	10	100	1 k	10 k	100 k
at T (K)	2288	2496	2749	3063	3405	3997

Atomic properties

Oxidation states 6, 5, 4, **3**, 2, 1,^[2] −1, −3 (an amphoteric oxide)

Electronegativity Pauling scale: 2.28

Ionization energies
1st: 719.7 kJ/mol
2nd: 1740 kJ/mol
3rd: 2997 kJ/mol

Atomic radius empirical: 134 pm

Covalent radius 142±7 pm

Miscellanea

Crystal structure face-centered cubic (fcc)



Speed of sound 4700 m/s (at 20 °C)
thin rod

Thermal expansion 8.2 μm/(m·K) (at 25 °C)

Thermal conductivity 150 W/(m·K)

Electrical resistivity 43.3 nΩ·m (at 0 °C)

Magnetic ordering paramagnetic^[3]

In isotopes weighing less than 103 (the stable isotope), the primary decay mode is electron capture and the primary decay product is ruthenium In isotopes greater than 103, the primary decay mode is beta emission and the primary product is palladium.^[24]

Source

- Wikipedia: Rhodium (<https://en.wikipedia.org/wiki/Rhodium>)

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Young's modulus	380 GPa
Shear modulus	150 GPa
Bulk modulus	275 GPa
Poisson ratio	0.26
Mohs hardness	6.0
Vickers hardness	1100–8000 MPa
Brinell hardness	980–1350 MPa
CAS Number	7440-16-6
History	
Discovery and first isolation	William Hyde Wollaston (1804)
Most stable isotopes of rhodium	

iso	NA	half-life	DM	DE (MeV)	DP
⁹⁹Rh	syn	16.1 d	ε	–	⁹⁹ Ru
			γ	0.089, 0.353, 0.528	–
^{101m}Rh	syn	4.34 d	ε	–	¹⁰¹ Ru
			IT	0.157	¹⁰¹ Rh
			γ	0.306, 0.545	–
¹⁰¹Rh	syn	3.3 y	ε	–	¹⁰¹ Ru
			γ	0.127, 0.198, 0.325	–
^{102m}Rh	syn	3.7 y	ε	–	¹⁰² Ru
			γ	0.475, 0.631, 0.697, 1.046	–
¹⁰²Rh	syn	207 d	ε	–	¹⁰² Ru
			β ⁺	0.826, 1.301	¹⁰² Ru
			β [–]	1.151	¹⁰² Pd
			γ	0.475, 0.628	–
¹⁰³Rh	100%	is stable with 58 neutrons			
¹⁰⁵Rh	syn	35.36 h	β [–]	0.247, 0.260, 0.566	¹⁰⁵ Pd
			γ	0.306, 0.318	–

