

45  
**Rh**  
Rhodium  
102.906

### Key Properties

Atomic Mass	102.906
Category	Transition Metals
State at 20°C	solid
Melting Point	1963°C
Boiling Point	3695°C
Density	12.41
Electron Config	[Kr] 4d85s1
Electronegativity	2.28
Year Discovered	1803
Discovered By	William Hyde Wollaston

### Did You Know?

- 1 It is one of the rarest and most valuable precious metals in the world, often costing much more than gold or platinum.
- 2 The vast majority of rhodium produced is used in automotive catalytic converters to reduce harmful nitrogen oxide emissions.
- 3 Because it is extremely hard and has a brilliant, silvery-white reflective surface, it is often used to plate 'white gold' and sterling silver jewelry to protect it from tarnishing and scratches.
- 4 Its name comes from the Greek word 'rhodon', meaning 'rose', because its chlorine compounds form a rose-colored solution in water.
- 5 It is considered the most corrosion-resistant of all the platinum group metals.

#### APPEARANCE

Rhodium is a hard, silvery-white, reflective metal.

#### SUPERHERO PERSONA

*"The Priceless Protector, one of the most valuable heroes, who cleans up the toxic fumes from cars."*

#### EVERYDAY CONNECTION

Rhodium is found in the catalytic converter in a car's exhaust system.

#### POP CULTURE

Rhodium is one of the rarest and most expensive metals — a frequent target for heists in thriller movies.

## Rhodium: The Rare and Catalytic Metal

Rhodium is a hard, shiny, silvery metal and is the rarest of all non-radioactive metals. Its name comes from the Greek word rhodon, meaning "rose," because many of its compounds have a striking rose-red color. Today, rhodium is most famous for its role in cleaning up car exhaust.

### Why Is Rhodium Useful?

Rhodium's value comes from its incredible catalytic properties and its resistance to heat and corrosion.

**Catalytic Converters:** About 80% of all rhodium is used in catalytic converters for cars, where it removes harmful nitrogen oxides (NO<sub>x</sub>) from exhaust, turning them into harmless nitrogen and oxygen.

**Chemical Industry:** Rhodium acts as a catalyst in producing chemicals like nitric acid and acetic acid.

**Electronics & Optics:** Because it has low electrical resistance and doesn't corrode easily, rhodium is used in electrical contacts, as a coating on optical fibers and mirrors, and even in headlight reflectors.

**Other Uses:** Rhodium is also used in crucibles (containers for very high temperatures) and thermocouple elements for measuring heat.

### Natural Abundance & History

Rhodium is extremely rare. It can sometimes be found in river sands in pure form but is mostly recovered as a by-product of copper and nickel refining. Only about 30 tonnes are produced worldwide each year.

**Discovery (1803):** English chemist William Wollaston discovered rhodium while analyzing platinum ore. He noticed a brilliant red solution and extracted a new metal from it, naming it after the rose-red color of its salts.

### Biological Role

Rhodium has no biological role. Some of its compounds are considered potentially carcinogenic, so it is handled with caution.