

# 1 Rhodium

Rhodium (atomic symbol Rh, atomic mass 45, atomic weight 102.9) is a silvery-white corrosion-resistant metal. It has high melting point and electrical resistance. It is the rarest of the precious metals, having a crustal abundance of 0.2ppb [2].

## 1.1 Occurrence

It is typically found as the pure metal or alloyed with other metals. Very rarely does it occur as a mineral sulfide. It is found in platinum and nickel ores. There is only one stable natural isotope of rhodium, Rh<sup>102</sup>. The principal sources exist in South Africa, the Ural Mountain region of Russia, and in Sudbury, Canada.

## 1.2 Uses

The primary use of rhodium is as a catalyst used in three-way automotive catalytic converters for internal combustion engines. Since the metal is resistant to corrosion, it is also alloyed with Pt and Pd to form high-temperature corrosion-resistant coatings. It can also be used as a catalyst in the production of oxo acids and acetic acid. Due to its durability and low reactivity, it has also found use in jewelry where it imparts a whiter color to gold and prevents tarnishing in silverware.

## 1.3 Demand and Production

In addition to being very rare, it is difficult to separate from other elements. World production is about 30 tonnes annually, with 80% of the metal produced in South Africa (2010). According to [1], in 2022 South Africa continues to be the major source of rhodium (60%), followed by Russia (10 per cent), Zimbabwe (5 per cent), Canada (2 per cent) and the U.S. (one per cent), according to Kitco.

Given the limited supply, it is no surprise the rhodium price is very volatile. The market size for rhodium in 2024 was \$2.44 BUSD, and demand is projected to increase by about 5% annually to 2032. About 1/3 of annual production is from recycling streams. Political instability could constrain supply, and EV uptake could constrain demand. However ICE technology is still increasing in world-wide use and this is consistent modest demand increases over the next several years.

## 1.4 Mining Companies

Given the rarity of the element, there are no pure-play rhodium mining companies. Instead it is a byproduct of platinum or nickel mining activity. Of the smaller companies, there are very few players. One is ELR.TO which has optionality on the price of Platinum but is heavily in debt and low on cash. Long-term investors are heavily underwater in this stock, although sporadically the stock will rally. Of the few stocks examined, most

are microcap explorers that have burned through their cash and long diluted generations of shareholders. As a general rule, it is a fool's game to hold these companies for any length of time based on historical performance.

## References

- [1] <https://www.northernontariobusiness.com/industry-news/mining/rhodium-has-been-raising-eyebrows-at-river-valley-palladium-project-5218385>
- [2] <https://en.wikipedia.org/wiki/Rhodium>