Rhodium Encyclopedia Article

Rhodium

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Rhodium

Rhodium can be classified as a transition metal, a member of the **platinum** group of **metals**, and as a precious metal. It is located in Group 9 of the **periodic table**, below **cobalt** (atomic number 27) and above **iridium** (atomic number 77). Rhodium's **atomic number** is 45, its atomic **mass** is 102.9055, and its chemical symbol is Rh.

Properties

Rhodium is a silver-white metal with a melting point of 3,571°F (1,966°C), a **boiling point** of about 8,100°F (about 4,500°C), and a **density** of 12.41 grams per cubic centimeter. It is a very good conductor of both **electricity** and **heat**. Chemically, rhodium is relatively inactive. It combines slowly with **oxygen** at high temperatures, but does not react with strong acids. It reacts with **chlorine** and **bromine**, but not, interestingly enough, with **fluorine**. It is one of a handful of elements that does not react with fluorine.

Occurrence and Extraction

Rhodium is one of the rarest elements on Earth with an abundance estimated at about 0.1 parts per billion. The element is found in combination with other members of the platinum group of metals in ores such as rhodite, sperrylite, and iridosimine. It is extracted as a byproduct from the recovery of platinum from its ores.

Discovery and Naming

Rhodium was discovered in about 1804 by the English chemist and physicist William Hyde Wollaston (1766-1828). Wollaston found two new elements, rhodium and **palladium**, in an ore found originally in South America. Wollaston suggested the name rhodium for one of the elements because the first compound of the element he prepared had a beautiful pinkis rose **color**. The Greek word for "rose" is *rhodon*.

Uses

Rhodium is used almost exclusively in the manufacture of alloys, especially alloys of platinum. Rhodium is harder than platinum and it has a higher melting point than platinum. It improves these two properties in an **alloy** containing the two elements. Rhodium alloys are used primarily for research and industrial applications to an limited extent. They are used to make thermocouples and to coat mirrors. Some compounds of rhodium have limited use as catalysts.