Rhenium Encyclopedia Article

Rhenium

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Contents

Rhenium Encyclopedia Article.....1

Contents.....2

Rhenium.....3

Rhenium

Rhenium is a transition metal, one of the elements found in the middle of the **periodic table**. It has an **atomic number** of 75, an atomic **mass** of 186.207, and a chemical symbol of Re.

Properties

Rhenium is a silvery metal that is both ductile and malleable. It has a melting point of 5,756°F (3,180°C), a **boiling point** of 10,166°F (5,630°C), and a **density** of 21.02 grams per cubic centimeter. All three of these values are among the highest for any chemical element. Rhenium is a moderately stable metal that does not react with **oxygen** or most acids very readily. It does react with concentrated **nitric acid** (HNO_3) and concentrated **sulfuric acid** (H_2SO_4).

Occurrence and Extraction

Rhenium is one of the rarest elements in the world with an abundance estimated at about one part per million in the Earth's crust. The major rhenium-producing countries of the world are Chile, Germany, the United Kingdom, and the United States. The metal is usually found as an impurity in **copper** and **molybdenum** ores.

Discovery and Naming

Rhenium was discovered in 1925 by a German research team that included Walter Noddack (1893-1960), **Ida Tacke Noddack**, and Otto Berg. The team named the element in honor of the Rhineland in western Germany.

Uses

About three-quarters of all rhenium consumed in the United States is used in the manufacture of superalloys--alloys containing **iron**, **cobalt**, or **nickel**. Such alloys have the ability to withstand very high temperatures and attack by oxygen and are used in making jet engine parts and gas turbine engines. Other rhenium alloys are used in making **temperature** control devices, such as thermostats; vacuum tubes, like those in a television set; and electromagnets, electrical contacts, and thermocouples. Finally, a relatively small amount of rhenium is used to make catalysts for the petroleum industry. The compounds of rhenium have virtually no commercial applications.