Niobium Encyclopedia Article

Niobium

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Niobium

Niobium is a transition element. It is the fifth element in Row 5 of the **periodic table**. Niobium's **atomic number** is 41, its atomic **mass** is 92.9064, and its chemical symbol is Nb.

Properties

Niobium is a shiny gray metal with a melting point of 4,474°F (2,468°C), a **boiling point** of 8,901°F (4,927°C), and a **density** of 8.57 grams per cubic centimeter. Niobium is a relatively inert element, although it does react with **oxygen** and concentrated acids at high temperatures.

Occurrence and Extraction

Niobium occurs primarily in two minerals, columbite and pyrochylore. A second element, **tantalum**, is always present in these minerals along with niobium. Separating the two elements from each other is very difficult. The abundance of niobium in the Earth's crust is estimated to be about 20 parts per million.

Discovery and Naming

The story of niobium's discovery is a long and fascinating tale. The element was for many years confused with its "twin," tantalum. The two elements always occur together in nature and have very similar properties. Discovery of the element was first announced in 1801 by the English chemist Charles Hatchett (1765- 1847). However, it was more than 40 years before enough research had been completed that chemists generally recognized Hatchett's claim to discovery of the element.

Hatchett originally suggested the name *columbium* for the element after the mineral, columbite, in which it was found. A half century later, the German chemist Heinrich Rose (1795-1864), after confirming Hatchett's original discovery, proposed a different name--niobium. Rose made the suggestion because in Greek mythology, Niobe is the daughter of the god Tantalus, from whom the name tantalum comes. In 1949, the element was finally and officially named niobium. However, many metallurgists still use the older name of columbium for the element.

Uses

Niobium is used primarily in the manufacture of alloys for use in products such as nuclear reactor components, airplanes and space vehicles, and skateboards. Niobium alloys are becoming more popular for the manufacture of jewelry because they are light weight and do not produce allergic skin reactions. Niobium alloys are also used in the

construction of superconducting magnets. The most powerful magnet in the world is one at the Lawrence Berkeley Laboratory in Berkeley, California. It is made of niobium and **tin** and is three times as strong as the best magnet previously made.