

Holmium Encyclopedia Article

Holmium

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Holmium

Holmium is a rare earth element, one of the elements found in Row 6 of the **periodic table** between Groups 2 and 3. Its **atomic number** is 67, its atomic **mass** is 164.9303, and its chemical symbol is Ho.

Properties

Holmium is a silvery metal that is soft, ductile, and malleable. It has a melting point of 2,680°F (1,470°C), a **boiling point** of 4,930°F (2,720°C), and a **density** of 8.803 grams per cubic centimeter. It tends to be chemically stable at room **temperature**, but becomes more active at higher temperatures when, for example, it reacts with **oxygen** to form holmium **oxide** (Ho₂O₃).

Occurrence and Extraction

The abundance of holmium in the Earth's crust is estimated to be about 0.7-1.2 parts per million, making it less common than most other **rare earth elements**, but more common than some familiar elements, such as **iodine**, **silver**, **mercury**, and **gold**. The most common ores of holmium are monazite and gadolinite. Holmium is extracted from its ores by heating **calcium** metal with holmium fluoride: $3\text{Ca} + 2\text{HoF}_3 \rightarrow 3\text{CaF}_2 + 2\text{Ho}$.

Discovery and Naming

Holmium was discovered in 1879 by the Swedish chemist Per Teodor Cleve (1840-1905). Cleve found the new element in a mineral called ytterite that had been discovered nearly a century earlier by a Swedish army officer, Carl Axel Arrhenius (1757- 1824). Ytterite was the subject of considerable research on the part of chemists and mineralogists and was eventually to yield nine new elements. Cleve named the new element after his birthplace, Stockholm.

Uses

Holmium has very few practical purposes, one exception being in the manufacture of specialized types of laser. Holmium **lasers** are now used to some extent in eye surgery where they are used to treat glaucoma and reduce abnormal eye pressure.