

Thulium Encyclopedia Article

Thulium

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Thulium

Thulium is a rare earth element, one of the elements found in row 6 of the **periodic table**. It has an **atomic number** of 69, an atomic **mass** of 168.9342, and a chemical symbol of Tm.

Properties

Thulium is a silvery metal so soft it can be cut with a knife. It is both malleable and ductile and can be worked rather easily. Its melting point is 2,822°F (1,550°C), its **boiling point** is 3,141°F (1,727°C), and its **density** is 9.318 grams per cubic centimeter. Thulium is not a very active metal, although it does react slowly with **water** and more rapidly with most acids.

Occurrence and Extraction

Thulium is one of the rarest of the **rare earth elements** with an abundance in the Earth's crust of about 0.2-1 part per million. Its most common ores are monazite, euxenite, and gadolinite. The pure metal can be produced by treating thulium fluoride (TmF₃) with **calcium** metal: $2\text{TmF}_3 + 3\text{Ca} \rightarrow 3\text{CaF}_2 + 2\text{Tm}$

Discovery and Naming

Thulium is one of the elements discovered in yttria, a mineral first found by a Swedish army officer named Carl Axel Arrhenius (1757-1824) in 1787 near the town of Ytterby, Sweden. Eventually, yttria was to yield nine new elements. Thulium was found by the Swedish chemist Per Teodor Cleve (1840-1905) in 1879. He named the element for the ancient name of Scandinavia, Thule.

Uses

Thulium is too expensive to have many commercial applications. It is sometimes used in special types of **lasers** that are used for photographic purposes on satellites circling the Earth.