Thorium Encyclopedia Article

Thorium

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Thorium

Thorium is a member of the actinide family, a group of elements in Row 7 of the **periodic table**. It has an **atomic number** of 90, an atomic **mass** of 232.0381, and a chemical symbol of Th.

Properties

Thorium is a silvery white, soft, metal with physical properties similar to those of **lead**. It can be hammered, rolled, bent, cut, shaped, and welded rather easily. Its melting point is about 3,270°F (1,800°C), its **boiling point** is about 8,130°F (4,500°C), and its **density** is 11.7 grams per cubic centimeter.

All isotopes of thorium are radioactive. The most stable (thorium-232) has a half life of 1.405×10^{10} years. The element is relatively active, combining with **oxygen** to form thorium dioxide (ThO_2) and reacting with most acids.

Occurrence and Extraction

Thorium is a relatively abundant element with an abundance of about 15 parts per million in the Earth's crust. Its primary ores are thorite and monazite. The latter mineral is found somewhat commonly in beach sand, which may contain up to 10% of the element.

Discovery and Naming

Thorium was "discovered" twice by the Swedish chemist Jöns Jakob Berzelius. His first announcement was made in 1815, a report he later retracted when he found the substance he had discovered was actually a compound, **yttrium phosphate** (YPO_4). Ten years later, Berzelius once again announced the discovery of a new element, for which he suggested the name thorium. This time he was correct. The name he suggested was in honor of the Scandinavian god Thor.

Uses

Traditionally, thorium has had relatively few commercial uses. The one with which people are most likely to be familiar is in portable gas lanterns where it is used to make the mantle. Since gas mantles made with thorium are radioactive, their use has been phased out. There is some hope that thorium may eventually be used to replace **uranium** in **nuclear reactors** and nuclear weapons. Thorium itself is not fissionable, but it can be converted to uranium-233, an **isotope** which does undergo fission. At this point, the technology for converting thorium to uranium-233 has not been developed on a commercial scale.