Lutetium Encyclopedia Article

Lutetium

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Lutetium

Lutetium is the heaviest, rarest, and most expensive of the **rare earth elements**, the elements found in Row 6 of the **periodic table** between Groups 2 and 3. Lutetium's **atomic number** is 71, its atomic **mass** is 174.97, and its chemical symbol is Lu.

Properties

Lutetium is a silvery white metal that is quite soft and ductile. It has a melting point of 3,006°F (1,652°C), a **boiling point** of 6,021°F (3,327°C), and a **density** of 8.49 grams per cubic centimeter. The element reacts slowly with cold **water** and with most acids.

Occurrence and Extraction

Lutetium is thought to be very rare in the Earth's crust with an abundance of about 0.8-1.7 parts per million. The most common ore of lutetium is monazite, in which its **concentration** is about 0.003%. The metal is produced by first converting its ores to lutetium fluoride (LuF_3) and then treating that compound with **sodium** metal: $3Na + LuF_3$ Lu + 3NaF.

Discovery and Naming

Lutetium was discovered almost simultaneously in 1907 by three researchers, George Urbain (1872-1938) of France, Karl Auer (Baron von Welsbach; 1858-1929) of Germany, and Charles James (1880-1926) of the United States. The element was one of nine new elements discovered in an unusual black rock known as ytterite first discovered in 1787 by a Swedish army officer, Carl Axel Arrhenius (1757-1824). The name of the element, suggested by Urbain, comes from the ancient name for the city of Paris, Lutecia.

Uses

Because lutetium is so expensive (currently, about $75 a gram), it has almost no commercial use. The one exception is that it is sometimes used as a catalyst in the petroleum industry.