Indium Encyclopedia Article

Indium

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Indium

Indium is the fourth element in Group 13 of the **periodic table**, a member of the **aluminum** family. It has an **atomic number** of 49, an atomic **mass** of 114.82, and a chemical symbol of In.

Properties

Indium is a silvery white, shiny metal with a **density** of 7.31 grams per cubic centimeter. It is one of the softest **metals**, even softer than **lead**. One unusual property of the element is that it produces a strange screeching sound when bent, a sound known as "**tin** cry." Indium's melting point is 313.9°F (156.6°C) and its **boiling point** is 3,767°F (2,075°C). Chemically, indium is moderately active, dissolving in most acids, but not reacting with **oxygen** at room **temperature**.

Occurrence and Extraction

Indium is a relatively rare element in the Earth's crust with an abundance thought to be about 0.1 part per million. It is usually found in conjunction with ores of **zinc**. No indium is produced in the United States. Canada, China, and Russia are the world's largest producers of the element. Indium is obtained by extracting it from zinc ores while they are being processed to produce zinc metal.

Discovery and Naming

Indium was discovered in 1863 by German chemists Ferdinand Reich (1799-1882) and Hieronymus Theodor Richter (1824-98). Reich and Richter discovered the element while conducting a spectroscopic analysis of zinc ores. During this research, they found a set of spectral lines that had never been seen before and concluded that the lines were produced by a previously unknown element. They gave the element the name indium after the **color** of the most prominent of the element's spectral lines, a brilliant indigo blue.

Uses

The primary use of indium is in the production of alloys. Indium has sometimes been called a "metal vitamin" because the addition of very small amounts of the element can dramatically change the properties of an **alloy**. For example, very small amounts of indium are sometimes added to **gold** and **platinum** alloys to make them much harder and stronger. Such alloys are used in electronic devices and dental materials. The single most important application of indium alloys, however, is as coatings for materials that are subjected to high temperatures and stress, such as the outer surface or working parts of airplanes and space craft. Indium is also used in making optical devices, such

as photovoltaic cells. One of the most advanced photovoltaic systems now available uses **copper** indium diselenide ($CuInSe_2$) in its solar cells.