Indium is the 49th element, abbreviated as In. Discovered in 1863, indium rarely is found as an isolated element. Alloys of indium have low melting points and are good semiconductors; it’s use in LCD displays has recently increased the demand for Indium.

History

The element indium (named from the Latin indicum, for the color indigo) was discovered in 1863 by Reich and Richter. It is a rare metal, with an abundance similar to that of silver. It is generally found in deposits with zinc and refineries which produce this more common metal often sell indium as well. The pure metal is so soft that you can “wipe” it onto other materials in much the same way as lead (or even pencil graphite). It is corrosion resistant.

As with gallium, identification of indium involved the recognition of new emission spectrum lines (its name was chosen because of indigo lines in its spectrum). Curiously enough, Reich who did the initial chemical isolation work was color blind and had to turn over his experiment to an assistant (Richter) who was the first to observe the characteristic lines.

Like pure tin, pure indium emits a squealing sound when bent.

Properties

Indium has the chemical symbol In and the atomic number 49. It has the electron configuration [Kr] 2s²2p¹ and may adopt the +1 or +3 oxidation state; however, the +3 state is more common. It is a soft, malleable metal that is similar to gallium. Indium forms InAs, which is found in photoconductors in optical instruments. The physical properties of indium include its silver-white color and the “tin cry” it makes when bent. Indium is soluble in acids, but does not react with oxygen at room temperature. It is obtained by separation from zinc ores. Indium is mainly used to make alloys, and only a small amount is required to enhance the metal strength. For example, indium is added to gold or platinum to make the metals more useful industrial tools.

Production

Almost all of Indium is produced as a byproduct of zinc production. A small amount is produced from tin production. Indium is produced from the slag of zinc production (the waste matter separated from metals during the smelting or refining of ore) using a leaching process. Leaching is an technique used to extract metals which converts them to an aqueous state. Indium is leached using \( \text{HCl} \) or \( \text{H}_2\text{SO}_4 \). There are many different processes to extract Indium from the zinc slag, and they vary from processor to processor.

Indium recovered from this process is metal of a low-grade. It is further refined to be a high purity metal in refineries. Indium is produced in a lot of different forms, such as foil, ribbon, ingot, plates, powder, shot and pellets, and wire.

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