*** Name Origin:**

Latin: Germania (Germany).

*** Sources:**

Obtained from refining copper, zinc and lead.

*** Uses:**

Widely used in semiconductors, infrared prisms, reflectors in projectors, wide angle lenses and dentistry.

*** Additional Notes:**

Predicted by Mendeleev in 1871 as ekasilicon, and discovered by Winkler in 1886. The metal is found in argyrodite, a sulfide of germanium and silver; in germanite, which contains 8% of the element; in zinc ores; in coal; and in other minerals. The element is frequently obtained commercially from flue dusts of smelters processing zinc ores, and has been recovered from the by-products of combustion of certain coals. Its presence in coal insures a large reserve of the element in the years to come. Germanium can be separated from other metals by fractional distillation of its volatile tetrachloride. The tetrachloride may then be hydrolyzed to give GeO_2; the dioxide can be reduced with hydrogen to give the metal. Recently developed zone-refining techniques permit the production of germanium of ultra-high purity. The element is a gray-white metalloid, and in its pure state is crystalline and brittle, retaining its luster in air at room temperature. It is a very important semiconductor material. Zone-refining techniques have led to production of crystalline germanium for semiconductor use with an impurity of only one part in 10^{10}. Doped with arsenic, gallium, or other elements, it is used as a transistor element in thousands of electronic applications. Its application as a semiconductor element now provides the largest use for germanium. Germanium is also finding many other applications including use as an alloying agent, as a phosphor in fluorescent lamps, and as a catalyst. Germanium and germanium oxide are transparent to the infrared and are used in infrared spectroscopes and other optical equipment, including extremely sensitive infrared detectors. Germanium oxide's high index of refraction and dispersion has made it useful as a component of glasses used in wide-angle camera lenses and microscope objectives. The field of organogermanium chemistry is becoming increasingly important. Certain germanium compounds have a low mammalian toxicity, but a marked activity against certain bacteria, which makes them of interest as chemotherapeutic agents. Twenty nine isotopes and isomers are known, five of which occur naturally. Its occurrance is 0.0007% of the earth's crust. In the elemental form it is a lustrous white, brittle metaloid. When crystalized it has a diamond cubic structure. It is a poor conductor and is used in electronics in rectifying devices and transistors. It is also used in dental alloys. There are several compounds which contain germanium. "Germaine" or germanium hydride is a colorless gas GeH_4 prepared by the action of lithium aluminum hydride on germanium halide in an ether solution. Germaine is a hazardous substance UN2192 which is classified as a poisonous gas (2.3). It is also a flammable gas (2.1). Other compounds include : Germanium dichloride Ge Cl_2, Germanium dioxide GeO_2, Germanium tetrachloride GeC_{14} this is very irritating to eyes and membranes.