Silicon Encyclopedia Article

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Silicon

Silicon (Si, element 14) is a nonmetallic chemical found in group IV, the **carbon** family, on the **Periodic table**. Swedish chemist Jons Jacob Berzelius first isolated and described the element in 1824.

In nature, silicon is always paired with another substance; it combines with **oxygen** to form **quartz** and **sand** (silicon dioxide, SiO_2) or with oxygen and a metal to form silicates, which are used to make **glass**, pottery, china, and other ceramics. The relatively inactive element occurs in nearly all rocks, as well as in **soil**, sand, and clays. It is the second most abundant element found in the earth's **crust**, surpassed only by oxygen.

Scientists create pure silicon by heating sand and coke in an electric furnace to remove oxide (oxygen) from the element. Pure silicon is colored dark gray and has a crystalline structure similar to **diamond**. The **crystals** are extremely hard and demonstrate remarkable insulating and semiconducting properties, which has made silicon an invaluable resource for the computing and electronics industries. A single purified silicon crystal contains millions of atoms accompanied by loosely attached electrons that break free upon the introduction of energy, such as light or heat. The flowing electrons conduct **electricity**, hence the term semiconductor. Today, silicon is the backbone of computer chips, transistors and many other electronic components.

Silicones, a chain of alternating silicon and oxygen atoms, are chemically inert and stable in the presence of high heat. The compounds are often used as lubricants, waterproofing materials and varnishes and enamels. Silicone gels have long been used as implants in the human body.

Silicon has an atomic weight of 28.086, a **melting** point of 2,570°F (1,410°C) and a boiling point of 4,270°F (2,355°C). Only three stable isotopes of silicon are known to exist: silicon-28, silicon-29 and silicon-30.

See Also

Earth (Planet)