Topic Page: Boron

Definition: **boron** from *Dictionary of Energy*

Chemistry. a highly reactive nonmetallic chemical element, having the symbol B, the atomic number 5, an atomic weight of 10.811, a specific gravity of 2.34 (amorphous) or 2.46 (crystalline), a valence of 3, and a melting point of 2300°C. Used in the manufacture of enamels, as a shield for nuclear reactions, in advanced aerospace structures, and as the dopant in photovoltaic cell material.

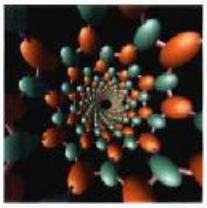

Image from: **The Quest for High-Performance Computation** in *Computer Graphics Companion*

Summary Article: **boron**
From *The Columbia Encyclopedia*

(bōr'ŏn) [New Gr. from *borax*], chemical element; symbol B; at. no. 5; interval in which at. wt. ranges 10.806–10.821; m.p. about 2,300 degrees Celsius; sublimation point about 2,550 degrees Celsius; sp. gr. 2.3 at 25 degrees Celsius; valence +3. Boron is a nonmetallic element existing as a dark brown to black amorphous powder or as an extremely hard, usually jet-black to silver-gray, brittle, lustrous, metallike crystalline solid (see allotropy). One tetragonal and two rhombohedral forms of crystalline boron are known.

The chemistry of boron more closely resembles the chemistry of silicon than that of the other elements in Group 13 of the periodic table, of which it is a member. The chemical reactivity of boron depends on its form; generally, the crystalline form is far less reactive than the amorphous form. For example, the amorphous powder is oxidized slowly in air at room temperature and ignites spontaneously at high temperatures to form an oxide; the crystalline form is oxidized only very slowly, even at higher temperatures. Boron forms compounds with oxygen, hydrogen, the halogens, nitrogen, phosphorus, and carbon (only diamond is harder than boron carbide). It also forms organic compounds.

Boron is most commonly used in its compounds, especially borax and boric acid. Boron is used as a deoxidizer and degasifier in metallurgy. Because it absorbs neutrons, it is used in the shielding material and in some control rods of nuclear reactors. Boron fibers, which have a very high tensile strength, can be added to plastics to make a material that is stronger than steel yet lighter than aluminum.

Boron does not occur free in nature. Large deposits of borax, kermite, colemanite, and other boron minerals are found in the arid regions of the W United States. It occurs also in the mineral tourmaline. The simplest method of preparing boron is the reduction of boron trioxide by heating with magnesium; this yields the amorphous powder. Boron was first isolated in England in 1807 by Sir Humphry Davy and then in France in 1808 by Joseph Louis Gay-Lussac and Louis Jacques Thénard.

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