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TETRAHEDRAL STRUCTURE OF SOME CHEMICAL SPECIES

The tetrahedral structure of species such as CH_4 and NH_4^+ requires an adjustment of atomic theory. The isolated carbon atom in its ground state has the electron configuration $1s^2 2s^2 2p_x^1 2p_y^1$ (the 2p electrons are unpaired). If the unpaired electrons in the 2p orbital are used for bonding, this leads us to expect that carbon would form two bonds at an angle of 90°. Actually carbon commonly forms four single bonds and each bond angle is 109,5°.

An example of a tetrahedral geometry Molecular is CH4. Carbon has four valence electrons and therefore needs other 4 electrons from four hydrogen atoms to complete the octet. . The molecule is three-dimensional tetrahedral. Methane is the simplest molecule contained in natural gas.

TETRAHEDRAL STRUCTURE IN ARCHITECTURE

Mathematics is used by architects to design new and more stable buildings. The calculation of the particular shape is required to design solutions ensure stability. Alexander Graham Bell's tetrahedral observation tower is unveiled in 1907 in Nova Scotia. Alexander Graham Bell (1847-1922), is the American scientist of Scottish descent, best known as the inventor of the telephone, but we recognize Italian Meucci the first discovery

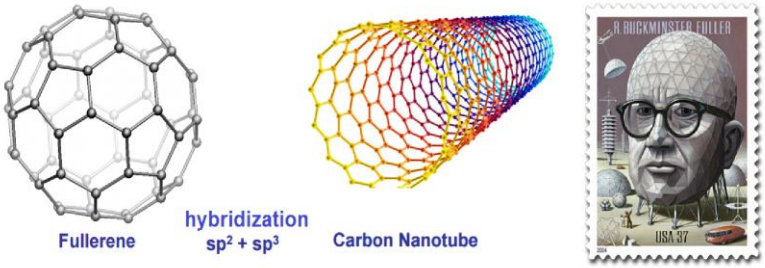
HYBRIDIZATION

Actually carbon commonly forms CH_4 four single bonds and each bond angle is 109,5° This angle directs each bond from carbon toward each of the corners of a regular tetrahedron. To explain these four equivalent bonds, we assume that prior to or during the formation of the bonds, four orbitals of the carbon atom are hybridized (or mixed) to form a new set of four equivalent orbitals. The carbon atom promotes one of the electrons from the 2s orbital to the empty $2p_z$ orbital to give the electronic arrangement $2s^1 2p_x^1 2p_y^1 2p_z^1$ for the valence shell electrons. These four orbitals are rearranged mathematically according to specific rules to obtain for new equivalent hybrid orbitals: these are designed sp^3 orbitals.

A particular hybridization sp2 - sp3 carbon atom can lead to the formation of fullerenes and nanotubes. Macromolecules are particularly resistant structure combined planar-tetrahedral.

HYBRIDIZATION IN ARCHITECTURE

Richard Buckminster Fuller (Milton, 12 luglio 1895 – Los Angeles, 1º luglio 1983) is famous mainly for its civil and tensile structures called geodesic domes. Their construction is based on simple solids, including the tetrahedron, which can be regarded approximation of the sphere. The facilities are extremely stable. The geodesic dome was Fuller patented in 1954, and was derived from the geometry of the natural elements and hybrid chemical atom of carbon.



(dalle lezioni al Pacioli di Crema anno 1997)