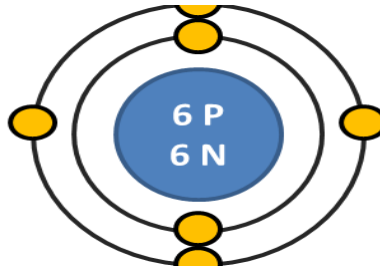
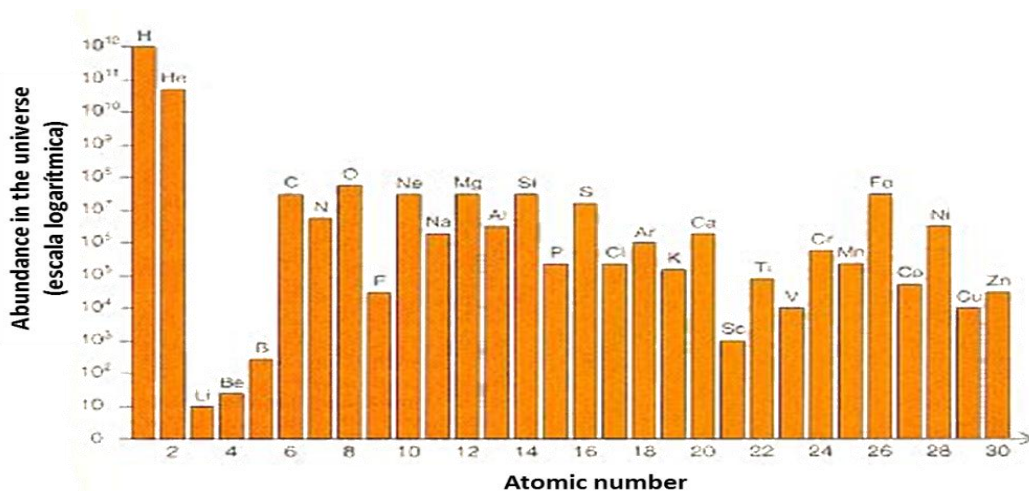


CARBON



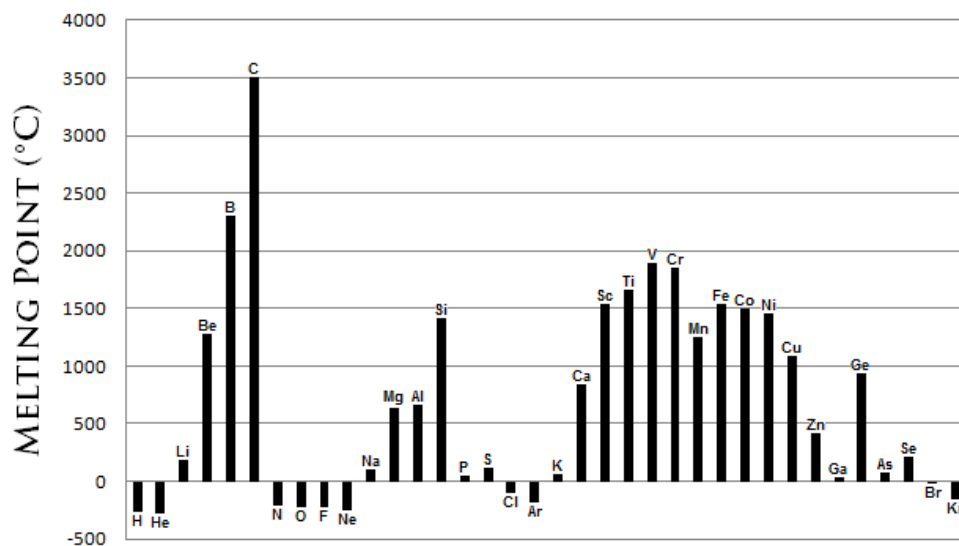
Carbon is an element of symbol “C”, with atomic number 6 (this means it has 6 protons in its core or nuclei), is a non-metallic element, with available electrons available to form covalent bonds (tetravalent).

Carbon is the basic chemical element for known life and the 4th most abundant element in the universe after hydrogen, helium, and oxygen being present in the Sun, stars, meteors, comets, and in the atmosphere of most planets. It is a known elements by humans for over 6000 years.



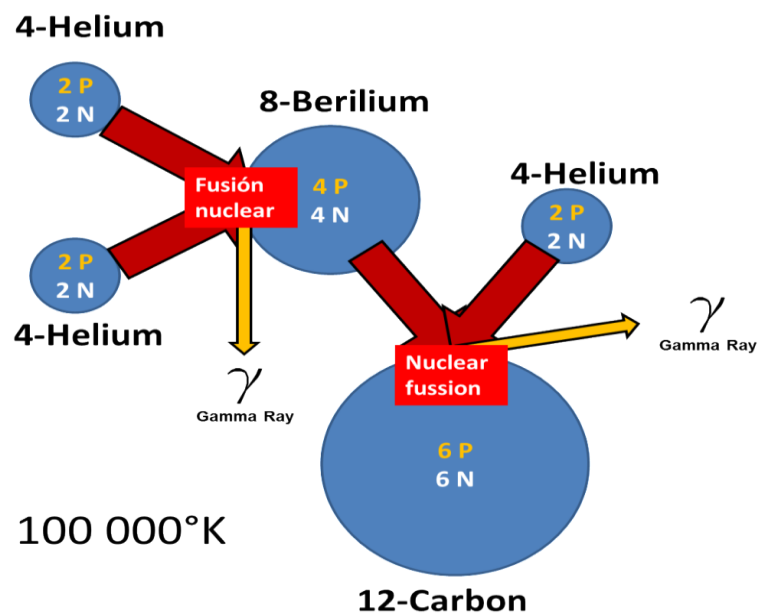
Carbon is the 15th most abundant element in the earth's crust (0.2% of it). In combination with oxygen to form carbon dioxide is dissolved in the air and in water bodies, mainly in the ocean.

Carbon has the highest melting point of all the elements (3900 ° K) remaining solid at much higher temperatures than metals such as tungsten or rhenium, with a boiling point of 5100 ° K.

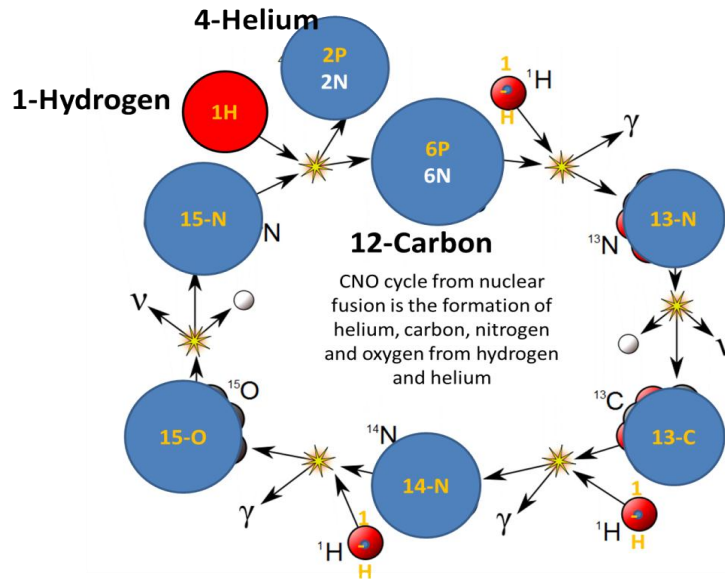


Although carbon is very susceptible to oxidation, it resists oxidation more effectively than iron and copper at standard temperatures without reacting at sulfuric acid, hydrochloric acid, chlorine or any alkaline substance. The most common oxidation state of inorganic carbon is +4.

For carbon formation (carbon nucleosynthesis), it is required a temperature over $100,000^{\circ}\text{K}$ and a high concentration of nuclei of 1-Hydrogen and 4-Helium in the center of giant or supergiant stars. To make them available for the formation of life as we know it, these carbon atoms most have to be expelled as space dust by supernova explosions that subsequently form solar systems like ours.



This nucleosynthesis might occur in the CNO cycle as well



There are 3 carbon isotopes occurring in nature, 12-C and 13-C are stable isotopes, while 14-C is a radioactive isotope with an average life of 5730 years before decaying.

On Earth, carbon is found in inorganic form in limestone's, dolomites and carbon dioxide in the air, although there are significant amounts in fossil fuels, i.e. organic deposits of coal, oil and natural gas can be obtained by burning organic compounds in low oxygen.

Carbon is present in all known forms of life (20% by weight of living organisms is carbon) and in the human body is the second most abundant element by mass (18.5%) after oxygen.

% of elements in the human body

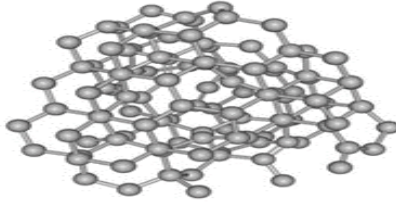


There have been identified about 10 million organic compounds containing carbon, only a small fraction of the mathematical possibilities of association of this element, most of them possible at common temperatures on Earth.

Carbon can be formed into various types of chemical structures (allotropes), all solid under normal conditions which are chemically resistant to high temperatures, but with different physical behavior. The most popular forms are amorphous carbon, graphite and diamond.

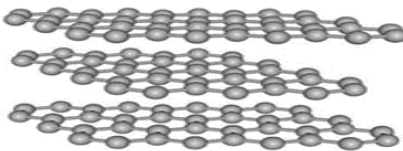
Amorphous carbon is a black opaque material. Is the main constituent of coal and activated carbon and one of the cheapest materials on Earth.

Amorphous carbon does not have a regular crystalline structure, neither defined patterns, it rather has irregular crystals which consist essentially of graphite, with a density between 1.8 to 2.1 tons per cubic meter.



Graphite is a black material with metallic and refractory luster, being one of the softest materials known, an excellent electrical conductor and can be used as super lubricant.

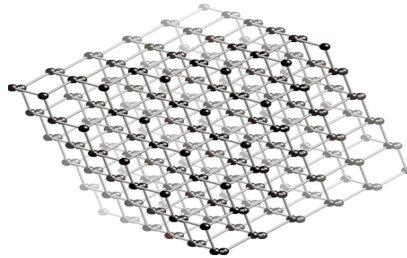
Graphite is the form taken by carbon under normal pressure and temperature, comprising of sheets of two-dimensional networks with very strong covalent bonds from each other, and Van der Waals bonds between the layers, which makes a soft material. In the direction of the sheets graphite is a good electrical conductor while keeping outer electrons available for electrical conduction, while perpendicular to the direction of the sheets have a low conductivity, with a density of 2.3 tons per cubic meter.



Graphite can be found in natural deposits on Earth. Graphite can produce graphene, the thinnest material that can be hardest known to date.

A Diamond is a highly transparent material formed at very high pressures with a density almost twice that of graphite and is the hardest known material, with a very low electrical conductivity, making the existing abrasive material and one of the most expensive materials on Earth, found in kimberlite of ancient volcanoes.

A diamond has a very high heat conductivity, therefore, while touching a diamond with the skin, it will conduct heat much faster than other materials, so a person will interpret that he's touching a very cold material.



A diamond consists of a three dimensional network of atoms, each atom is bonded to other tetrahedron as C₄, forming a cubic structure equal to that of silicon and germanium, making a carbon-carbon bond very tough in terms of scratch resistance although thermodynamically unstable under normal conditions, with a density of 3.5 tons per cubic meter.

Source: <http://www.artinaid.com/2013/04/carbon-3/>