Sodium - Na

Chemical properties of sodium - Health effects of sodium - Environmental effects of sodium

Atomic number	11
Atomic mass	22.98977 g.mol $^{-1}$
Electronegativity according to Pauling	0.9
Density	0.97 g.cm $^{-3}$ at 20 °C
Melting point	97.5 °C
Boiling point	883 °C
Vanderwaals radius	0.196 nm
Ionic radius	0.095 (+1) nm
Isotopes	3
Electronic shell	[Ne] $3s^1$
Energy of first ionisation	495.7 kJ.mol $^{-1}$
Standard potential	- 2.71 V
Discovered by	Sir Humphrey Davy in 1807

Sodium

Chemical element, symbol: Na, atomic number: 11 and atomic weight 22,9898. It's a soft metal, reactive and with a low melting point, with a relative density of 0,97 at 20ºC (68ºF). From the commercial point of view, sodium is the most important of all the alkaline metals.

Sodium reacts quickly with water, and also with snow and ice, to produce sodium hydroxide and hydrogen. When it's exposed to air, metallic sodium recently cut looses its silvery appearance and acquires an opaque grey colour due to the formation of a sodium oxide coating. Sodium doesn't react with nitrogen, not even at very high temperatures, but it can react with ammonia to form sodium amide. Sodium and hydrogen react above 200ºC (390ºF) to form sodium hydride. Sodium hardly reacts with carbon, but it does react with halogens. It also reacts with various metallic halides to form the metal and sodium chloride. Sodium doesn't react with paraffinic hydrocarbons, but it forms addition compounds with naphthalene and other aromatic polycyclic compounds and with aryl alkenes. The reaction of sodium with alcohols is similar to the reaction of sodium with water, but slower. There are two general reactions with organic halides. One of them requires the condensation of two organic compounds, which form halogens when those are eliminated. The second type of reaction includes the replacement of halogen by sodium, to obtain a sodium organic compound.

Applications

Sodium in its metallic form is very important in making esters and in the manufacture of organic compounds. Sodium is also a component of sodium chloride (NaCl) a very important compound found everywhere in the living environment. Other uses are: to improve the structure of certain alloys; in soap, in combination with fatty acids, in sodium vapor lamps, to descal metals, to purify molten metals.
Solid sodium carbonate is needed to make glass.

Sodium in the enviornment

Sodium is the sixth most abundant element in The Earth's crust, which contains 2,83% of sodium in all its forms. Sodium is, after chloride, the second most abundant element dissolved in seawater. The most important sodium salts found in nature are sodium chloride (halite or rock salt), sodium carbonate (trona or soda), sodium borate (borax), sodium nitrate and sodium sulfate. Sodium salts are found in seawater (1.05%), salty lakes, alkaline lakes and mineral spring water.
The production of salt is around 200 million tonnes per year; this huge amount is mainly extracted from salt deposits by pumping water down bore holes to dissolve it and pumping up brine.
The sun and many other stars shine with visible light in which the yellow component dominates and this is given out by sodium atoms in a high-energy state.

Health effects of sodium

Sodium is a compound of many foodstuffs, for instance of common salt. It is necessary for humans to maintain the balance of the physical fluids system. Sodium is also required for nerve and muscle functioning. Too much sodium can damage our kidneys and increases the chances of high blood pressure.
The amount of sodium a person consumes each day varies from individual to individual and from culture to culture; some people get as little as 2 g/day, some as much as 20 grams. Sodium is essential, but controversely surrounds the amount required.

Contact of sodium with water, including perspiration causes the formation of sodium hydroxide fumes, which are highly irritating to skin, eyes, nose and throat. This may cause sneezing and coughing. Very severe exposures may result in difficult breathing, coughing and chemical bronchitis. Contact to the skin may cause itching, tingling, thermal and caustic burns and permanent damage. Contact with eyes may result in permanent damage and loss of sight.

Environmental effects of sodium

Sodium's powdered form is highly explosive in water and a poison combined and uncombined with many other elements.