Potassium - K

Chemical properties of potassium - Health effects of potassium - Environmental effects of potassium

Atomic number	19
Atomic mass	39.0983 g.mol $^{-1}$
Electronegativity according to Pauling	0.8
Density	0.86 g.cm $^{-3}$ at 0 °C
Melting point	63.2 °C
Boiling point	760 °C
Vanderwaals radius	0.235 nm
Ionic radius	0.133 (+1)
Isotopes	5
Electronic shell	[Ar] 4s^{1}
Energy of first ionisation	418.6 kJ.mol $^{-1}$
Discovered by	Sir Davy in 1808

Potassium

The name is derived from the english word potash. The chemical symbol K comes from *kalium*, the Mediaeval Latin for potash, which may have derived from the arabic word *qali*, meaning alkali.
Potassium is a soft, silvery-white metal, member of the alkali group of the periodic chart. Potassium is silvery when first cut but it oxidizes rapidly in air and tarnishes within minutes, so it is generally stored under oil or grease. It is light enough to float into water with which it reacts instantly to release hydrogen, which burns with a lilac flame.

The chemistry of potassium is almost etirely that of the potassium ion, K^+.

Applications

Most potassium (95 %) goes into fertilizers and the rest goes mainly into making potassium hydroxide (KOH), by the electrolysis of potassium chloride solution, and then converting this to potassium carbonate (K_2CO_3). Potassium carbonate goes into glass manufacture, expecially the glass used to make televisions, while potassium hydroxide is used to make liquid soaps and detergents. A little potassium chloride goes into pharmaceuticals, medical drips and saline injections.
Other potassium salts are used in baking, photography and tanning leather, and to make iodize salts. In all cases it is the negative anion, not the potassium, which is the key to their use.

Potassium in the environment

Most potassium occurs in the Earth's crust as minerals, such as feldspars and clays. Potassium is leached from these by weathering, which explains why there is quite a lot of this element in the sea (0.75 g/liter).
Minerals mined for their potassium are pinkish and sylvite, carnallite and alunite. The main mining area used to be Germany, which had a monopoly of potassium before the first World War. Today most potassium minerals come from Canada, USA and Chile. The world production of potassim ores is about 50 million tonnes, and reserves are vast (more than 10 billion tonnes).
Potassium is a key plant element. Although it is soluble in water, little is lost from undisturbed soils because as it is released from dead plants and animal excrements, it quickly become strongly bound to clay particles, and it is retained ready to be readsorbed by the roots of other plants.

Health effects of potassium

Potassium can be found in vegetables, fruit, potatoes, meat, bread, milk and nuts. It plays an important role in the physical fluid system of humans and it assists nerve functions. Potassium, as the ion K+, concnetrate inside cells, and 95% of the body's potassium is so located. When our kidneys are somehow malfunctioning an accumulation of potassium will consist. This can lead to disturbing heartbeats.

Potassium can effect you when breathed in. Inhalation of dust or mists can irritate the eyes, nose, throat, lungs with sneezing, coughing and sore throat. Higher exposures may cause a build up of fluid in the lungs, this can cause death. Skin and eye contact can cause severe burns leading to permanent damage.

Environmental effects of potassium

Together with nitrogen and phosphorous, potassium is one of the essential macrominerals for plant survival. Its presence is of great importance for soil health, plant growth and animal nutrition. Its primary function in the plant is its role in the maintenance of osmotic pressure and cell size, thereby influencing photosynthesis and energy production as well as stomatal opening and carbon dioxide supply, plant turgor and translocation of nutrients. As such, the element is required in relatively large proportions by the growing plant.

The consequences of low potassium levels are apparent in a variety of symptoms: restricted growth, reduced flowering, lower yields and lower quality produce.

High water soluble levels of potassium cause damage to germinating seedlings, inhibits the uptake of other minerals and reduces the quality of the crop.

Check out our potassium in water page