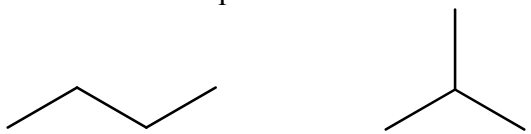
Naming Organic Compounds

In the early development of organic chemistry names were not systematic but only conveyed some information, usually about the origin of the substance. Methanol was called wood alcohol because it was obtained by destructive distillation or pyrolysis of wood. Methane was called marsh gas as it was formed during underwater decomposition of vegetable matter in marshes.

At present compounds are named according to the method recommended by the International Union of Pure and Applied Chemistry (IUPAC). Besides, many well-established common names and abbreviations are used, e.g. TNT (trinitrotoluene) and DDT (dichloro-diphenyl-trichloroetane).

In order to name organic compounds, certain common alkyl groups must be recognized. Alkyl groups have the general formula $C_nH_{2n+1}^-$ or R^- (one less hydrogen atom than the corresponding alkane). The name of each group is formed from the name of the corresponding alkane by dropping "ane" and substituting the "yl" ending. The letter R is often used in formulas to mean any alkyl group. The prefixes *iso*-, *sec*- (for secondary) and *tero*- or *t*- (for tertiary) indicate structural information. There is an example of two isomers:



n-butane

iso-butane

The name of the alkane consists of the name of the parent compound prefixed to the names of the branch-chain alkyl groups attached to it. When the same alkyl branch chain occurs more than once, a prefix (di-, tri-, tetra-, etc.) is written in front of the alkyl name (e.g. dimethyl indicates two methyl groups). When several different alkyl groups are attached to the parent compound they are listed in alphabetical order (e.g. ethyl before methyl as in 3-ethyl-4-methyloctane).

Naming Inorganic Compounds

There are common and systematic names. Common names are arbitrary names that are not based on the chemical composition of compounds but associated with one of its outstanding physical or chemical properties. Common names are frequently used in industry because systematic names are too long or too technical for everyday use.

The formula for most elements is simply the symbol of the element. Some elements are diatomic (e.g. hydrogen, H_2) and some are polyatomic (e.g. sulfur, S_8). An ion is a charged particle produces by adding or removing one or more electrons from a neutral atom. A negative ion is called an anion. To name an anion consisting of only one element, you must use the stem of the parent element name and change the ending to –ide. For Example, the Cl^- ion is named by using the stem chlor from chloride and adding –ide to form a chloride ion.

Binary compounds contain only two different elements. They are formed when a metal combines with a nonmetal to form a binary ionic compound. A metal loses one or more electrons to become an anion. The cation is written first in the formula, followed by the anion. For example, sodium chloride is composed of ions of sodium and ions of chlorine. The name of the metal, sodium, is written first. The second part is derived from the nonmetal, chlorine, using the stem chlor – and adding the ending –ide; it is therefore named chloride. The compound name is sodium chloride. There is a different system for naming compounds formed between two nonmetals. The element that occurs first is written and named first. The name of the second element retains the ending –ide. A Latin or Greek prefix is attached to the name of each element to indicate the number of atoms of the element in the molecule (mono-, di-, tri-, tetra-, penta-, hexa-, hepta-, octa-, nona-, deca-).

Binary acids are named by placing the prefix hydro- in front of and the suffix –ic after the stem of the nonmetal name. Then the word acid is added, e.g. hydrochloric acid. The simplest way to recognize many acids is to know that acid formulas often begin with hydrogen. Inorganic compounds containing hydrogen, oxygen and one other element, often a nonmetal, are called oxy-acids. Hydrogen is the first element and the second part of the formula consists of a polyatomic ion containing oxygen. To determine the type of acid, the polyatomic ion following hydrogen is taken into consideration. The name of the polyatomic ion is modified in the following manner: the ending –ate changes to -ic and –ite changes to –ous. The examples are:

SO_4^{2-} sulfate – H_2SO_4 sulfuric acid SO_3^{2-} sulfite – H_2SO_3 sulfurous acid

Fragment książki: *English for Students of Chemistry* M. Charmas, Maria Curie-Skłodowska University Press Lublin **2008**