Functional Group Encyclopedia Article

Functional Group

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Functional Group

A molecule's functional group is the chemically reactive portion, or segment, of an organic chemical **molecule**. In this sense, the functional group determines most of a compound's chemical (and some of its physical) properties. The functional group of an alkene is its carbon-carbon double bond. The **alkyne functional group** is the carbon-carbon triple bond. Alkanes, which contain carbon-carbon single bonds and carbon-hydrogen bonds that are much less reactive than the other common functional groups, are sometimes not considered to contain functional groups.

Functional groups characterize the various families of organic compounds, and the naming conventions used in organic **chemistry**. For example, the functional group common to the alcohols is the -OH, or hydroxyl group. The three molecules CH_3-OH, CH_3-CH_2-OH, and CH_3-CH_2-CH_2-OH (known as **methanol**, **ethanol**, and 1-propanol, respectively) share certain properties in common because they all contain this functional group, despite there being a different number of **carbon** atoms in each molecule. Other important functional groups are R-F, R-Cl, R-Br, and R-I (for the alkyl halides); R-O-R' (for ethers); R-SH (for thiols, also known as mercaptans); R-NH_2, R_2NH, and R_3N (for amines); R-(C=O)-H (for aldehydes); R-(C=O)-R' (for ketones); R-(C=O)-OH (for carboxylic acids); R-(C=O)-OR' (for carboxylic esters); and R-(C=O)-NH_2, R-(C=O)-NHR', and R-(C=O)-NR'R'' (for amides). In these examples, R represents any **alkyl group**.

More complex molecules may contain two or more functional groups. The **amino acids**, for example, contain both amino and carboxyl groups. These biologically important molecules form the building blocks from which large protein molecules are formed.