## Order of Precedence of Functional Groups

In organic chemistry, functional groups are specific groups of atoms within molecules that are responsible for the characteristic chemical reactions of those molecules. The same functional group will undergo the same or similar chemical reaction(s) regardless of the size of the molecule it is a part of.

When compounds contain more than one functional group, the order of precedence determines which groups are named with prefix - i.e. as substituents -, or suffix forms - i.e. as part of the parent name of the molecule. The highest precedence group takes the suffix, with all others taking the prefix form. However, double and triple bonds only take suffix form (-ene and -yne) and are used with other suffixes.

Prefixed substituents are ordered alphabetically (excluding any modifiers such as di-, tri-, etc.), e.g. chlorofluoromethane, not fluorochloromethane. If there are multiple functional groups of the same type, either prefixed or suffixed, the position numbers are ordered numerically (thus ethane-1,2-diol, not ethane-2,1-diol.)

| Priority | Functional group | Formula | Prefix | Suffix |
| :---: | :---: | :---: | :---: | :---: |
| 1 | Cations e.g. Ammonium | $-\mathrm{NH}_{4}{ }^{+}$ | -onio-ammonio- | -onium -ammonium |
| 2 | Carboxylic acids | - COOH | carboxy- | -oic acid |
| 3 | Carboxylic acid derivatives Esters Amides | -COOR <br> $-\mathrm{CONH}_{2}$ | R-oxycarbonyl-carbamoyl- | -amide |
| 4 | Aldehydes | - CHO | formyl- | -al |
| 5 | Ketones | >CO | oxo- | -one |
| 6 | Alcohols Thiols | $\begin{array}{\|l\|} \hline-\mathrm{OH} \\ -\mathrm{SH} \end{array}$ | hydroxy-sulfanyl- | $\begin{array}{\|l\|l\|} \hline \text {-ol } \\ \text {-thiol } \end{array}$ |
| 7 | Amines | $-\mathrm{NH}_{2}$ | amino- | -amine |
| 8 | Ethers Thioethers | $\left\lvert\, \begin{aligned} & \text {-O- } \\ & \text {-S- } \end{aligned}\right.$ | -oxy--thio- |  |
| 9 | Peroxides Disulfides | $\begin{array}{\|l\|} \hline-\mathrm{OO}- \\ \text {-SS- } \end{array}$ | -peroxy- <br> -disulfanyl- |  |
| 10 | Alkenes Alkynes | $\begin{aligned} & \mathrm{C}=\mathrm{C} \\ & \mathrm{C} \equiv \mathrm{C} \end{aligned}$ |  | -ene <br> -yne |

A final note: When the substituent names for side-chains contain the prefixes iso..., sec-..., tert-..., and neo (which are commonly used for side-chains containing three to five carbons), the hyphenated prefixes (sec-and tert-) are disregarded when alphabetizing.

