



Principles of Chemical Nomenclature

A Guide to IUPAC Recommendations

G. J. LEIGH, H. A. FAVRE
AND W. V. METANOMSKI

Edited by G. J. Leigh

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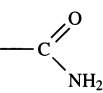
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CHAPTER 3

Table 3.2 Some important compound classes and functional groups.

Class	Functional group	General constitution*	
Alkanes	None	C_nH_{2n+2}	
Alkenes	$C=C$	$R_2C=CR_2$	(R or Ar or H)
Alkynes	$C\equiv C$	$RC\equiv CR$	(R or Ar or H)
Alcohols	-OH	R-OH	
Aldehydes		R-CHO	(R or Ar)
Amides		R-CONH ₂	(R or Ar)
Amines	-NH ₂ , -NHR, -NR ₂	R-NH ₂ R-NH-R R-NR ₂	(R or Ar)
Carboxylic acids		R-COOH	(R or Ar)
Ethers	-O-	R-O-R	(R or Ar)
Esters		R-COOR	(R or Ar)
Halogeno compounds	-F, -Cl, -Br, -I	R-F, R-Cl R-Br, R-I	(R or Ar)
Ketones	$>C=O$	R-CO-R	(R or Ar)
Nitriles	-CN	R-CN	(R or Ar)

* In this table, and in common organic usage, Ar represents an aromatic group rather than the element of atomic number 18, and R represents an aliphatic group.

Examples

8. $[IrHCl_2(C_5H_5N)(NH_3)]$
9. $K_3[Fe(CN)_6]$
10. $[Ru(NH_3)_5(N_2)]Cl_2$
11. $K_2[Cr(CN)_2O_2(O_2)(NH_3)]$
12. $[Cu\{OC(NH_2)_2\}_2Cl_2]$
13. $[ICl_4]^-$

It is often a matter of choice whether a species is regarded as a coordination entity or not. Thus, sulfate may be regarded as a complex of S^{VI} with four O^{2-} ligands. It would then be represented as $[SO_4]^{2-}$, but it is not considered generally necessary to use square brackets here. The position with regard to $[ICl_4]^-$ is not so clear-cut: $[ICl_4]^-$, $(ICl_4)^-$ and ICl_4^- would all be acceptable, depending upon the precise circumstances of use.

NAMING OF SUBSTANCES

The names of characteristic groups are cited as suffixes or prefixes when these classes of organic compound are named using substitutive nomenclature. If only one characteristic group is present, then its name is cited as a suffix. If more than one type of characteristic group is present, one must be chosen as the principal group and its name is then cited as a suffix. The names of all other characteristic groups are cited as detachable prefixes. However, some characteristic groups are expressed in a name as prefixes only and are never cited as suffixes. Suffixes and prefixes are listed in Tables 4.11 and 4.12. The detailed usage is exemplified in the following discussion.

Table 4.11 Some characteristic groups with names always cited as prefixes in substitutive nomenclature.

Class	Group	Prefix	Class	Group	Prefix
Halogen compounds	F	fluoro-	Ethers	O-R	R-oxy-
	Cl	chloro-	Nitro compounds	NO ₂	nitro-
	Br	bromo-	Nitroso compounds	NO	nitroso-
	I	iodo-			

Table 4.12 Some characteristic groups* with names cited as suffixes or prefixes in substitutive nomenclature, presented in decreasing order of seniority (see Tables 4.10 and 6.1).

Class	Suffix	Prefix	Group
Radicals			
Anions	see Table 4.14		
Cations			
Carboxylic acids	-oic acid -carboxylic acid	carboxy-† carboxy-	-(C)OOH -COOH
Sulfonic acids	-sulfonic acid	sulfo-	-SO ₂ OH
Esters	-†	(R-oxy)-oxo- R-oxycarbonyl-	-(C)OOR -COOR
Acyl halides	-†	halo-oxo- halocarbonyl-	-(C)OHal -COHal
Amides	-amide -carboxamide	amino-oxo- aminocarbonyl-	-(C)ONH ₂ -CONH ₂
Nitriles	-nitrile -carbonitrile	cyano-† cyano-	-(C)N -CN
Aldehydes	-al -carbaldehyde	oxo- formyl-	-(C)HO -CHO
Ketones	-one	oxo-	=O
Alcohols, phenols	-ol	hydroxy-	-OH

* The carbon atoms in parentheses in some groups belong to the parent hydride, normally a chain. If there are no parentheses in the formula, the name of the group as a whole is added to the name of the parent hydride.

† When attached to a ring, the groups -COOH and -CN are never treated as -(C)OOH or -(C)N. If an unbranched chain is directly linked to two or more carboxy groups, the name is based upon that chain and the carboxy groups are treated as substituents -COOH and not as (C)OOH.

‡ See discussion of functional class nomenclature, Chapter 4, Section 4.6 (p. 96).