

ORGANIC CHEMISTRY

• Points to remember in Nomenclature

Examples of Compound containing different functional groups with common / trival names.

No. of carbon atoms	Prefix	-CHO (Aldehyde)	-COOH(-ic acid)	-COCl.(-yl chloride)	-CONH ₂ (Amide)
1	Form	HCHO Formaldehyde	HCOOH Formic acid	HCOCI Formyl chloride	HCONH ₂ Formamide
2	Acet	CH ₃ CHO Acetaldehyde	CH ₃ COOH Acetic acid	CH ₃ COCl Acetyl chloride	CH ₃ CONH ₂ Acetamide
3	Propion	CH ₃ CH ₂ CHO Propion aldehyde	CH ₃ CH ₂ COOH Propionic acid	CH ₃ CH ₂ COCl Propionyl chloride	CH ₃ CH ₂ CONH ₂ Propionamide
4	Butyr	CH ₃ CH ₂ CH ₂ CHO n-Butyraldehyde	CH ₃ CH ₂ CH ₂ COOH n-Butyric acid	CH ₃ CH ₂ CH ₂ COCl n-Butyryl chloride	CH ₃ CH ₂ CH ₂ CONH ₂ n-Butyramide
5	Valer	CH ₃ CH ₂ CH ₂ CH ₂ C HO n-Valeraldehyde	CH ₃ CH ₂ CH ₂ CH ₂ C OOH n-Valeric acid	CH ₃ CH ₂ CH ₂ CH ₂ COCl n-Valeryl chloride	CH ₃ CH ₂ CH ₂ CH ₂ CO NH ₂ n-Valeramide
3C+1 Double bond	Acryl	CH ₂ =CH-CHO Acrylaldehyde	CH ₂ =CH-COOH Acrylic acid	CH ₂ =CH-COCl Acryl chloride	CH ₂ =CH-CONH ₂ Acrylamide
4C + 1 Double bond (at 2 nd Carbon. atom)	Croton	CH ₃ -CH=CH-CHO Crotonaldehyde	CH ₃ CH ₂ =CH-COOH Crotonic acid	CH ₃ CH ₂ =CH-COCl Crotonyl chloride	CH ₃ CH ₂ =CH-CONH ₂ Crotonamide

No. of carbon atoms	Prefix	$-\text{CN}(-\text{O nitrile})$	$-\text{N}=\text{C}(\text{Oisonitrile})$ If Suffix isocyanide is used than. Carbon atom of $-\text{NC}$ not counted. If suffix carbyl amine is used. Carbon atom of $-\text{NC}$ not counted. If O-isonitrile is used \rightarrow Carbon atom of $-\text{NC}$ counted	$-\text{COOR}$ Ester
1	Form	$\text{H}-\text{C}\equiv\text{N}$ Formonitrile	$\text{H}-\text{N}=\text{C}$ Formoisonitrile	HCOOCH_3 Methyl formate
2	Acet	$\text{CH}_3\text{C}\equiv\text{N}$ Acetonitrile	$\text{CH}_3-\text{N}=\text{C}$ Acetoisonitrile	$\text{CH}_3\text{COOCH}_3$ Methyl acetate
3	Propion	$\text{CH}_3\text{CH}_2\text{C}\equiv\text{N}$ Propionitrile	$\text{CH}_3\text{CH}_2\text{N}=\text{C}$ Propionisonitrile	$\text{CH}_3\text{CH}_2\text{COOCH}_3$ Methyl propionate
4	Butyr	$\text{CH}_3\text{CH}_2\text{CH}_2\text{C}\equiv\text{N}$ n-Butyronitrile	$\text{CH}_3\text{CH}_2\text{CH}_2\text{N}=\text{C}$ n-Butyroisonitrile	$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOCH}_3$ Methyl n-butyrate
5	Valer	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}\equiv\text{N}$ n-Valeronitrile	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{N}=\text{C}$ n-Valeroisonitrile	$\left[\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2-\text{COOCH}_3 \\ \\ \text{CH}_3 \end{array} \right]$ Methyl isovalerate
3 C + 1 Double bond	Acryl	$\text{CH}_2=\text{CH}-\text{C}\equiv\text{N}$ Acrylonitrile	$\text{CH}_2=\text{CH}-\text{NC}$ Acrylisonitrile	$\text{CH}_2=\text{CHCOOCH}_3$ Methyl acrylate
4C + 1 Double bond (at 2 nd Carbon. atom)	Croton	$\text{CH}_3\text{CH}=\text{CH}-\text{C}\equiv\text{N}$ Crotononitrile	$\text{CH}_3-\text{CH}=\text{CH}-\text{NC}$ Crotonoisonitrile	$\text{CH}_3\text{CH}=\text{CHCOOCH}_3$ Methyl crotonate

Secondary suffix of some common functional groups (IUPAC)

A secondary suffix is added to the primary suffix to indicate the nature of the functional group present in the organic compounds. Secondary suffix of important functional groups are given below in their decreasing order of seniority.

	Class	Name	Suffix	Prefix
1.	$R-COOH$	Alkanoic Acid	- oic acid (carboxylic acid)	carboxy
2.	$R-SO_3H$	Alkane sulhonic Acid	- sulphonic acid	sulpho
3.	$R-C-O-C-R$ $\begin{array}{c} \quad \\ O \quad O \end{array}$	Alkanonic Anhydride	- oic anhydride (carboxylic anhydride)	-----
4.	$R-COOR$	Alkyl alkanoate	- oate (carboxylate)	alkoxy carbonyl or alkanoyl oxy halo carbonyl
5.	$R-C-X$ $\begin{array}{c} \\ O \end{array}$	Alkanoyl halide	-oyl halide (carbonyl halide)	halo carbonyl
6.	$R-C-NH_2$ $\begin{array}{c} \\ O \end{array}$	Alkanamide	- amide (carboxamide)	carbamoyl
7.	$R-C \equiv N$	Alkanenitrile	- nitrile (carbonitrile)	cyano
8.	$R-C-H$ $\begin{array}{c} \\ O \end{array}$	Alkanal	- al (carbaldehyde)	formyl / oxo
9.	$R-C-R$ $\begin{array}{c} \\ O \end{array}$	Alkanone	- one	oxo
10.	$R-OH$	Alkanol	- ol	hydroxy
11.	$R-SH$	Alkanethiol	- thiol	mercapto
12.	$R-NH_2$	Alkanamine	- amine	amino

IUPAC system of nomenclature

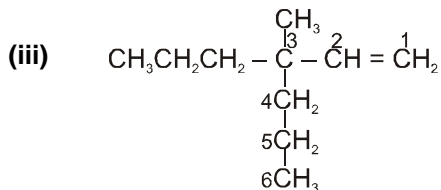
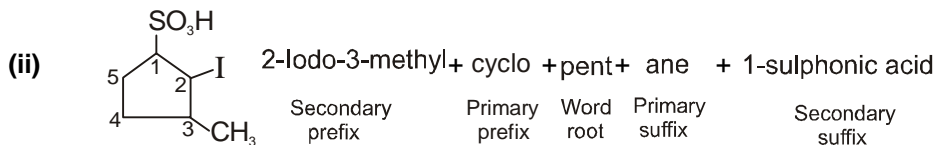
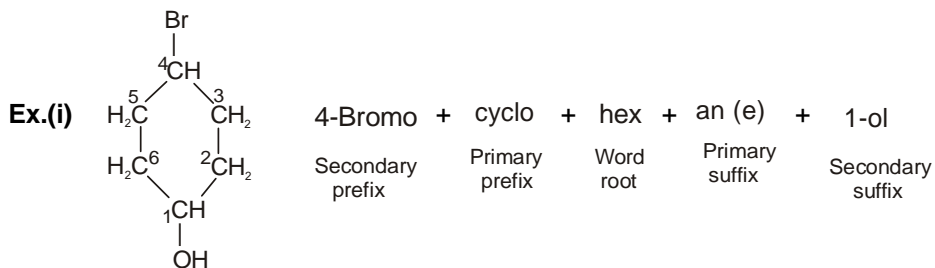
The IUPAC name of any organic compound consists of maximum five parts in the following sequence.

Secondary prefix + Primary prefix + Word root + Primary suffix + Secondary suffix

The following examples illustrate the use of word root, primary suffix and secondary suffix in naming of organic compounds.

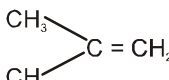
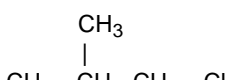
Organic compounds	Word root	Primary suffix	Secondary suffix	IUPAC name
CH_3CH_2OH	Eth	an(e)	ol	Ethanol
$CH_3CH_2CH_2NH_2$	Prop	an(e)	amine	Propanamine
$CH_3CH_2CH_2COOH$	But	an(e)	oic acid	Butanoic acid
CH_3CH_2CN	Prop	an(e)	nitrile	Propanenitrile
$CH_2=CHCHO$	Prop	en(e)	al	Propenal
$HC \equiv CCOOH$	Prop	yn(e)	oic acid	Propynoic acid

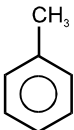
The following examples illustrate the use of word root, primary prefix and secondary prefix in naming of organic compounds.



Position of double bond will be indicated as no. 1, Hence name will be 3-Methyl-3-propylhex-1-ene

Common and IUPAC Names of Some Organic Compounds

S.No.	Compound	Common names	IUPAC name
1.	$\text{CH}_3\text{CH}=\text{CH}_2$	Propylene	Propene
2.		Isobutylene	2-Methylpropene
3.	$\text{H}_3\text{C}-\text{C}\equiv\text{CH}$	Methyl acetylene	Propyne
4.		Isobutyl chloride	1-Chloro-2-methylpropane

5.	$\begin{array}{c} \text{CH}_2 - \text{Br} \\ \\ \text{CH}_2 - \text{Br} \end{array}$	Ethylene dibromide	1, 2-Dibromoethane
6.	$\text{CH}_2 = \text{CH} - \text{Cl}$	Vinyl chloride	Chloroethene
7.	$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_3 \\ \\ \text{OH} \end{array}$	Isopropyl alcohol	Propan-2-ol
8.	$\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{OH}$	Allyl alcohol	Prop-2-en-1-ol
9.	$\begin{array}{c} \text{CH}_2 - \text{CH} - \text{CH}_2 \\ \quad \quad \\ \text{OH} \quad \text{OH} \quad \text{OH} \end{array}$	Glycerol or Glycerine	Propane-1, 2, 3-triol
10.	$\text{CH}_3 - \text{CHO}$	Acetaldehyde	Ethanal
11.	$\text{CH}_3 - \text{CO} - \text{CH}_2\text{CH}_3$	Ethyl methyl ketone	Butanone
12.	$\text{CH}_3 - \text{COOH}$	Acetic acid	Ethanoic acid
13.	$\begin{array}{c} \text{COOH} \\ \\ \text{COOH} \end{array}$	Oxalic acid	Ethanedioic acid
14.	$\begin{array}{c} \text{O} \\ \\ \text{H}_3\text{C} - \text{C} - \text{COOH} \end{array}$	Pyruvic acid	2-Oxopropanoic acid
15.	$\text{CH}_3 - \text{COCl}$	Acetyl chloride	Ethanoyl chloride
16.	$\text{CH}_3 - \text{CONH}_2$	Acetamide	Ethanamide
17.	$\text{CH}_3 - \text{NH}_2$	Methylamine	Methanamine
18.	$\text{CH}_3 - \text{CN}$	Methyl cyanide or Acetonitril	Ethanenitrile
19.	$\text{CH}_3 - \text{N}^+ \equiv \text{C}^-$	Methyl isocyanide or Methyl carbylamine	Methane isocyanide
20.		Toluene	Methylbenzene or Toluene●