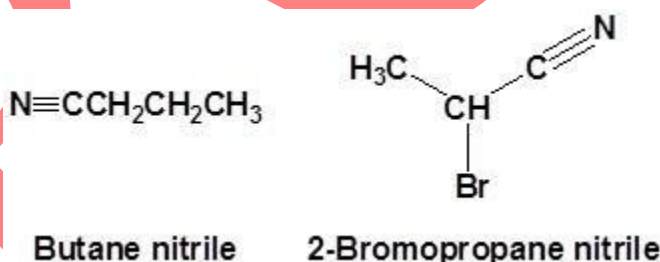


BP 202T - PHARMACEUTICAL ORGANIC CHEMISTRY - I**UNIT: 1 CLASSIFICATION, NOMENCLATURE & ISOMERISM****CLASS: 5****TOPIC: IUPAC NOMENCLATURE OF CYNAIDES, SULFONIC ACIDS & NITRO COMPOUNDS****Nitriles $R-C\equiv N$**

A **nitrile** is any organic compound with a $-C\equiv N$ functional group. In literature the prefix **cyano-** is used interchangeably with the term nitrile to refer to the functional group. Nitriles used to be known as cyanides; the smallest organic nitrile is ethanenitrile, CH_3CN , (old name: methyl cyanide or acetonitrile).

Open chain nitriles are named with the word **-nitrile** after the name of the parent alkane name. Remember to include the carbon atom of the nitrile as part of the parent chain. For example, CH_3CN has two carbons including the nitrile carbon, therefore it is ethanenitrile. The carbon in the nitrile is given the #1 location position. It is not necessary to include the location number in the name because it is assumed that the functional group will be on the end of the parent chain.

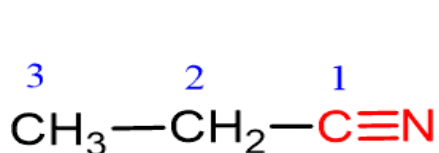


When a nitrile is the highest priority functional group attached to a cycloalkane, the name of the parent cycloalkane is followed by the word **-carbonitrile**. The ring carbon attached to the nitrile is numbered C1 and the nitrile is not given a number in the name.

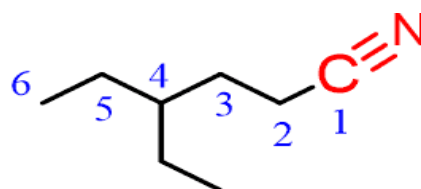
Nitriles are often named based off the common name of the corresponding carboxylic acid. This is done by replacing the **-ic acid** or **-oic acid** ending with **-onitrile**. In these cases the nitrile carbon is numbered C1 but the nitrile itself is not given a number in the name.

In the case of molecules containing a carboxylic acid and nitrile functional group, the nitrile is

named as a "cyano" substituent. Note! The carbon in the nitrile is not counted as part of the parent chain when named as a cyano substituent.

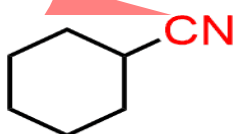


Propanenitrile

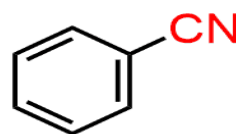


4-ethylhexanenitrile

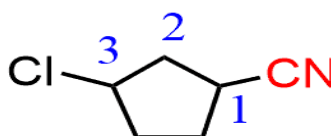
	Common Name	IUPAC Name
$\text{C}_2\text{H}_5\text{CN}$	Ethyl cyanide or Propionitrile	Propane nitrile
$\begin{array}{ccc} 3 & 2 & 1 \\ \text{CH}_2 & = & \text{CH} - \text{CN} \end{array}$	Vinyl cyanide or Acryl nitrile	Prop-2-ene nitrile
$\begin{array}{ccc} 3 & 2 & 1 \\ \text{CH}_3 - & \text{CH} - & \text{CN} \\ & & \\ & \text{CH}_3 & \end{array}$	Isopropyl cyanide or Isobutyl nitrile	2-Methyl propane nitrile
	Tolyl cyanide p-toluenitrile	p-toluenitrile



cyclohexanecarbonitrile



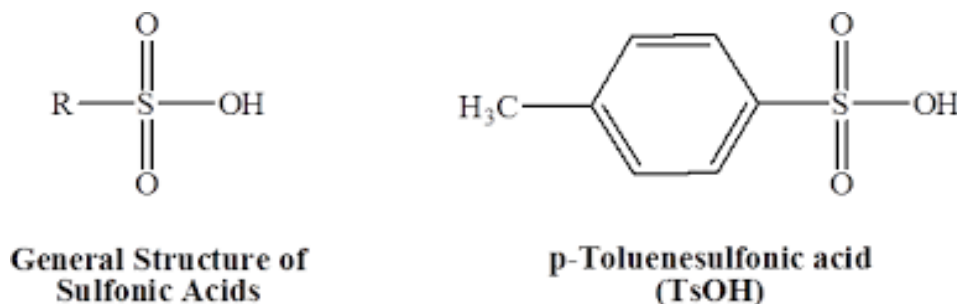
benzenecarbonitrile



3-chlorocyclopentane-1-carbonitrile

SULFONIC ACIDS:

Sulfonic acids are the compounds which contain the sulfo group (- SO₃H). The IUPAC names are obtained by adding the suffix (- Sulfonic acid) to the alkane name.



NITRO COMPOUNDS

Organic compounds containing nitro as the functional group are called nitro compounds. They may be aliphatic or aromatic according as the nitro group is attached to an alkyl or an aryl group. Example: RNO₂ (R is any alkyl group), Ar-NO₂ (Ar is any aryl group).

Classify Nitro Compounds

1. **Primary Nitroalkanes:** The nitro group is attached to a primary carbon atom. Example: RCH₂NO₂
2. **Secondary Nitroalkanes:** The nitro group is attached to a secondary carbon atom. Example: R₂CHNO₂
3. **Tertiary Nitroalkanes:** The nitro group is attached to a tertiary carbon atom. Example: R₃CNO₂

Rules of Nomenclature of Nitro Compounds

The name of any nitro compound is derived by adding the prefix nitro to the name of corresponding alkane or the arene. Aliphatic nitro compounds are called nitroalkanes or nitroparaffins, aromatic nitro compounds are called nitroarenes.

1. The positions of nitro group and other substituents, if any, on the parent nitroalkane or the nitro arene are indicated by arabic numbers, i.e., 1,2,3,...etc. with the carbon atom bearing the nitro group getting the lowest possible number.
2. For aromatic nitro compounds prefixes o-(for 1,2), m-(for 1,3) and p-(for 1,4) are used.

Common and IUPAC name of nitro compounds

CH_3NO_2 ----- Nitromethane

$\text{CH}_3\text{CH}_2\text{NO}_2$ ----- Nitroethane

$\text{CH}_3\text{CH}_2\text{NO}_2$ -1 ----- Nitropropane

$\text{CH}_3\text{CH}(\text{NO}_2)\text{CH}_3$ ----- 2-Nitropropane

$(\text{CH}_3)_3\text{CNO}_2$ ----- 2-Methyl-2-nitropropane

$\text{C}_6\text{H}_5\text{NO}_2$ ----- Nitrobenzene