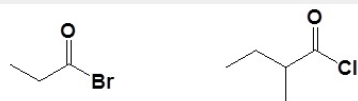


20.12: Nomenclature

Nomenclature of acid halides

The nomenclature of acid halides starts with the name of the corresponding carboxylic acid. The **-ic acid** ending is removed and replaced with the ending **-yl** followed by the name of the halogen with an **-ide** ending. This is true for both common and IUPAC nomenclature. The carbonyl carbon is given the #1 location number. 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.

Example 1:

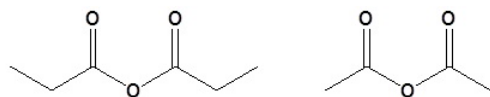


Propanoyl bromide 2-Methylbutanoyl chloride
(Propionyl bromide) (2-Methylbutyryl chloride)

The acid anhydride functional group results when two carboxylic acids combine and lose water (anhydride = without water). Symmetrical acid anhydrides are named like carboxylic acids except the ending **-acid** is replaced with **-anhydride**. This is true for both the IUPAC and Common nomenclature.

Nomenclature of Anhydrides

Symmetrical anhydrides



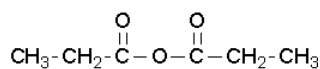
Propanoic anhydride Ethanoic anhydride
(Propionic anhydride) (Acetic anhydride)

Unsymmetrical acid anhydrides

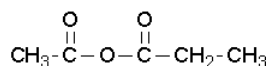
Unsymmetrical acid anhydrides are named by first naming each component carboxylic acid alphabetically arranged (without the word acid) followed by spaces and then the word anhydride.



Ethanoic propanoic anhydride Butanoic ethanoic anhydride
(Acetic propionic anhydride) (Acetic butyric anhydride)



propanoic anhydride



ethanoic propanoic anhydride

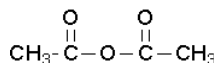
Try to name the following compound



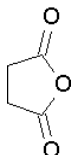
Try to draw a structure for the following compound

- 1,2-benzenedicarboxylic anhydride [J](#)

Common names that you should know



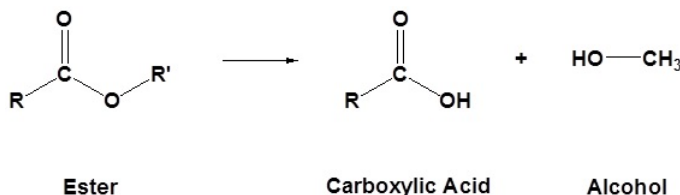
acetic anhydride (Try to name this anhydride by the proper name. [J](#))



succinic anhydride (Try to name this anhydride by the proper name. [J](#))

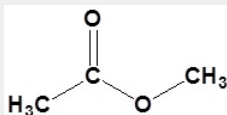
Nomenclature of Esters

Esters are made from a carboxylic acid and an alcohol.

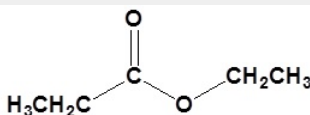


Esters are named as if the alkyl chain from the alcohol is a substituent. No number is assigned to this alkyl chain. This is followed by the name of the parent chain from the carboxylic acid part of the ester with an **-e** remove and replaced with the ending **-oate**.

Example 1:



Methyl ethanoate

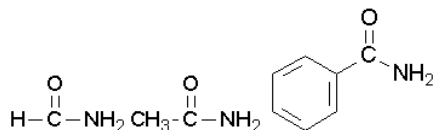


Ethyl propanoate

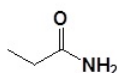
Nomenclature of amides

Primary amides

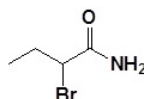
Primary amides are named by changing the name of the acid by dropping the **-oic acid** or **-ic acid** endings and adding **-amide**. The carbonyl carbon is given the #1 location number. It is not necessary to include the location number in the name because it is assumed that the functional group will be on the end of the parent chain.



methanamide or formamide (left), ethanamide or acetamide (center), benzamide (right)



Propanamide

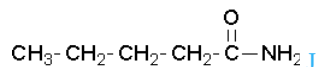


2-Bromobutanamide

Try to draw a structure for the following compound

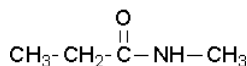
- 3-chlorobenzamide [J](#)

Try to name the following compound

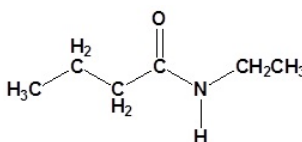


Secondary amides

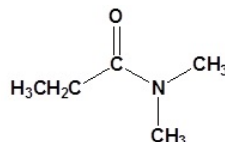
Secondary amides are named by using an upper case N to designate that the alkyl group is on the nitrogen atom. Alkyl groups attached to the nitrogen are named as substituents. The letter N is used to indicate they are attached to the nitrogen. Tertiary amides are named in the same way.



N-methylpropanamide



N-Ethylbutanamide

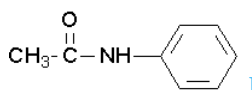


N,N-Dimethylpropanamide

Try to draw a structure for the following compound

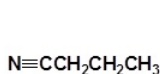
- N,N-dimethylformamide [J](#)

Try to name the following compound

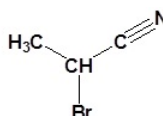


Name the parent alkane (include the carbon atom of the nitrile as part of the parent) followed with the word -nitrile. The carbon in the nitrile is given the #1 location position. It is not necessary to include the location number in the name because it is assumed that the functional group will be on the end of the parent chain.

Nomenclature of nitriles

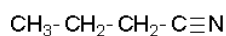


Butane nitrile



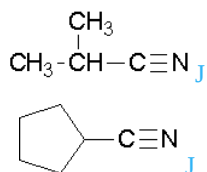
2-Bromopropane nitrile

Cycloalkanes are followed by the word -carbonitrile. The substituent name is cyano.



- 1-butanenitrile or 1-cyanopropane

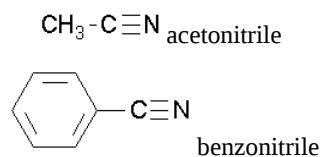
Try to name the following compounds using these conventions [J](#)



Try to draw structures for the following compounds

- butanedinitrile
- 2-methylcyclohexanecarbonitrile

Some common names that you should know are...



Try to draw a structure for the following compound

- 2-methoxybenzonitrile

Contributors

- Prof. Steven Farmer (Sonoma State University)

Richard Banks (Boise State University)

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