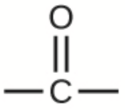
Introduction to Physical Science

Aldehydes, Ketones, Carboxylic Acids, & Esters

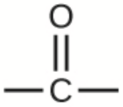
Presented by Robert Wagner

Aldehydes & Ketones



- The aldehydes and ketones contain a carbonyl group
  - This is a functional group with a carbon-oxygen double bond
- Naming - use the following suffixes
  - Aldehydes -al
  - Keytones - -one

Aldehydes & Ketones



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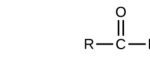
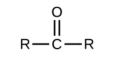
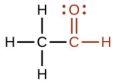


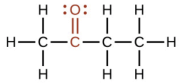
Functional group of an aldehyde



Functional group of a ketone



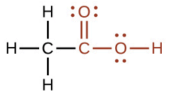
CH_3CHO
An aldehyde
ethanal (acetaldehyde)



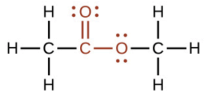
$CH_3COCH_2CH_3$
A ketone
butanone

Carboxylic Acids and Esters

- Contain a carbonyl group with a second oxygen atom
  - In a carboxylic acid, the second oxygen atom is bonded to a hydrogen atom
  - In an ester, the second oxygen atom is bonder to another carbon atom



ethanoic acid
(acetic acid)



methyl ethanoate
(methyl acetate)

Esters

- Many scents
  - Have low vapor pressure since they do not have hydrogen bonds between molecules

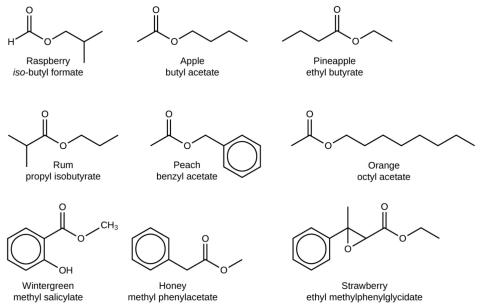


Image Credit: OpenStax Chemistry Example 20.8 CC BY 4.0

Discussion

- Simplest carboxylic acid:
  - - Formic Acid
  - Causes pain and irritation from ant and wasp sitings
- Acetic Acid - Vinegar
  -
- Flowers, perfumes and fruits
  - Aroma due to the presence of one or more esters

Summary

- Aldehydes & Ketones contain a functional group with a carbon-oxygen double bond
- Carboxylic Acids & Esters contain a carbonyl group with a second oxygen atom bonded to the carbonyl group
- Esters are responsible for many of the scents with which we are familiar