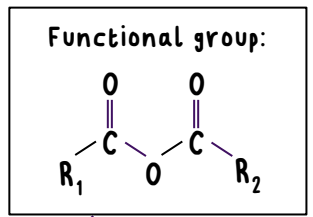


3.9 CARBOXYLIC ACIDS AND DERIVATIVES

Acid Anhydrides

This is because it is cheaper and safer to use

Ethanoic anhydride is industrially used instead of ethanoyl chloride



Suffix: -oic anhydride

E.g. Propanoic anhydride

Acyl Chlorides

E.g. Propanoyl chloride

Functional group: -COCl

Suffix: -oyl chloride

Nucleophilic addition-elimination reactions with...

Amides have the functional group -CONH₂

Produces an amide

...ammonia

Produces an ester

...alcohols

Produces an N-substituted amide

...amines

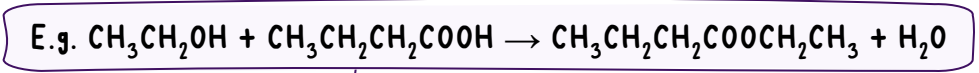
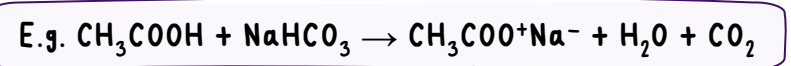
Produces a carboxylic acid

...water

Nucleophilic addition-elimination mechanisms

AQA

3.9 CARBOXYLIC ACIDS AND DERIVATIVES



Carboxylic Acids

- Weak acids
 - React with carbonates to form carbon dioxide
 - Only partially dissociate in water
- Functional group: $-\text{COOH}$

- Esterification reaction
 - Condensation reaction
 - React with alcohols to form esters
 - Strong acid catalyst required
 - E.g. Concentrated sulfuric acid
- Suffix: $-\text{oic acid}$
 - E.g. Propanoic acid

- Biodiesel produced by reacting vegetable oils with methanol
 - Potassium hydroxide catalyst
- Biodiesel is a mixture of methyl esters of long-chain carboxylic acids

Esters

- Animal fats and vegetable oils are esters of propan-1,2,3-triol (glycerol)
 - Fats and oils can undergo alkaline hydrolysis
 - Produces soap and glycerol
- Naming esters
 - First part of the name comes from the alcohol
 - Second part of the name comes from the carboxylic acid

- Functional group: $-\text{COO}-$
- Common uses
 - Flavourings
 - Perfumes
 - Solvents
 - Platercisers

- Hydrolysed to form alcohols
 - Base hydrolysis
 - Acid hydrolysis

AQA

