# AQA GCSE Organic chemistry 2 (CHEMISTRY ONLY)

## Structure and formula of alkenes

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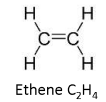
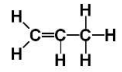
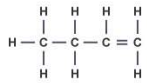
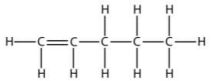
|---|---|
| **Alkenes** | *Hydrocarbons with a double carbon-carbon bond.* |
| **Unsaturated** | *Alkenes are unsaturated because they contain two fewer hydrogen atoms than their alkane counterparts.* |
| **General formula for alkenes** | $C_nH_{2n}$ |


Ethene $C_2H_4$


Propene $C_3H_6$


Butene $C_4H_8$


Pentene $C_5H_{10}$

## Reactions of alkenes

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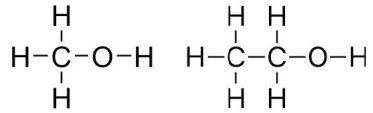
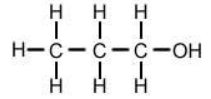
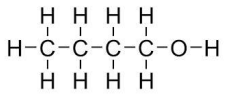
|---|---|---|
| **Functional group** | *Alkenes are hydrocarbons in the functional group C=C.* | The functional group of an organic compound determined their reactions. |
| **Alkene reactions** | *Alkenes react with oxygen in the same way as other hydrocarbons, just with a smoky flame due to incomplete combustion.* | Alkenes also react with hydrogen, water and the halogens. The C=C bond allows for the addition of other atoms. |


Methanol


Ethanol


Propanol


Butanol

## Alcohols

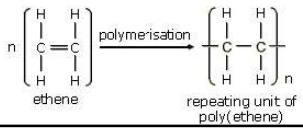
| | | |
|---|---|---|
| **Functional group** | *-OH*<br>*For example: $CH_3CH_2OH$* | Methanol, ethanol, propanol and butanol are the first four of the homologous series. |
| **Alcohol reactions** | *Alcohols react with sodium, air and water.* | Alcohols and sodium: bubbling, hydrogen gas given off and salt formed.<br>Alcohols and air: alcohols burn in air releasing carbon dioxide and water.<br>Alcohols and water: alcohols dissolve in water to form a neutral solution. |
| **Fermentation** | *Ethanol is produced from fermentation.* | When sugar solutions are fermented using yeast, aqueous solutions of ethanol are produced. The conditions needed for this process include a moderate temperature (25 – 50°C), water (from sugar solution) and an absence of oxygen. |

## Carboxylic acids

| | | |
|---|---|---|
| **Functional group** | *-COOH*<br>*For example: $CH_3COOH$* | Methanoic acid, ethanoic acid, propanoic acid and butanoic acid are the first four of the homologous series. |
| **Carboxylic acid reactions** | *Carboxylic acids react with carbonates, water and alcohols.* | Carboxylic acids and carbonates: These acids are neutralised by carbonates |
| | | Carboxylic acids and water: These acids dissolve in water. |
| | | Carboxylic acids and alcohols: The acids react with alcohols to form esters. |
| **Strength (HT only)** | *Carboxylic acids are weak acids* | Carboxylic acids only partially ionise in water. An aqueous solution of a weak acid with have a high pH (but still below 7). |

## Synthetic and naturally occurring polymers

### Addition polymerisation

| | | |
|---|---|---|
| **Polymers** | *Alkenes are used to make polymers by addition polymerisation.* | Many small molecules join together to form polymers (very large molecules). |
| **Displaying polymers** | *In addition polymers, the repeating unit has the same atoms as the monomer.* | It can be displayed like this:<br>  <br> |

### Condensation polymerisation (HT only)

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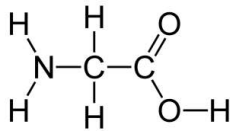
|---|---|---|
| **Condensation polymerisation** | *Condensation polymerisation involves monomers with two functional groups* | When these types of monomers react they join together and usually lose small molecules, such as water. This is why they are called condensation reactions. |

### Amino acids

Amino acids have two functional groups in a molecule. They react by condensation polymerisation to produce peptides.


Glycine

### DNA and naturally occurring polymers

| | |
|---|---|
| **DNA** | *Deoxyribonucleic acid is a large molecule essential for life. DNA gives the genetic instructions to ensure development and functioning of living organisms and viruses.* |
| **DNA structure** | *Most DNA molecules are two polymer chains made from four different monomers, called nucleotides. They are in the double helix formation.* |
| **Natural polymers** | *Other naturally occurring polymers include proteins, starch and cellulose and are all important for life.* |

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