



Cambridge IGCSE Chemistry

Topic 14: Organic chemistry

Alcohols

Notes





Describe the manufacture of ethanol by fermentation and by catalytic addition of steam to ethene

- Fermentation:
 - The fermentation of glucose
 - conditions: temperature of about 30°C, anaerobic conditions (no oxygen) and using the enzymes in yeast
 - equation: $\text{glucose} \rightarrow \text{ethanol} + \text{carbon dioxide}$
- Steam:
 - Reacting ethene with steam
 - conditions: phosphoric acid catalyst, temperature of about 300°C and a pressure of about 60-70 atm
 - equation: $\text{ethene} + \text{steam} \rightarrow \text{ethanol}$

(Extended only) Outline the advantages and disadvantages of these two methods of manufacturing ethanol

- Fermentation
 - Advantages
 - Renewable raw materials
 - Warm, normal pressure (inexpensive)
 - Little energy needed
 - Disadvantages
 - Batch process (stop-start)
 - A lot of workers needed
 - Slow
 - Impure – needs treatment
- Steam
 - Advantages
 - Continuous process (runs all the time)
 - Few workers needed
 - Fast
 - Pure
 - Disadvantages
 - Non-renewable raw materials
 - High temperature and pressure (expensive)
 - A lot of energy needed

Describe the properties of ethanol in terms of burning

- Burning in air or oxygen (complete combustion)
 - $\text{C}_2\text{H}_5\text{OH} + 3\text{O}_2 \rightarrow 2\text{CO}_2 + 3\text{H}_2\text{O}$
 - Can be used as a fuel in this way (this reaction produces heat energy)
 - Burns in a good supply of oxygen



Name the uses of ethanol as...

- A solvent
- A fuel

