

Alkene Polymerisation

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1.0.0

Revision History

Revision	Date	Author(s)	Description
1.0.0	18.10.2016	Sam White	Initial Version

1 Sequential Method

1. Mix 5 cm³ of methyl 2-methylpropenoate with 0.1 g di(dodecanoyl) peroxide in a old test tube within a fume cupboard.
2. Stand a wooden splint in the reaction mixture.
3. Place the test tube in a water bath of boiling water. Allow the bath with the test tube in it to cool.
4. Attempt to stir the reaction mixture with the splint every five minutes and observe the motion of the bubbles through the mixture.

1.1 Diagram

N/A

1.2 Reasons for Method

- The splint is used to test the viscosity of the mixture in the test tube.
- The preparation must take place in a fume cupboard as the monomer has a very irritating vapour, is highly flammable and has a relatively low boiling point (100 °C).

- As the reaction progresses the peroxide decomposes and produces bubbles which allow the increase in viscosity to be observed by looking at the speed of which the bubbles move through the mixture.
- An old test tube is used as it is difficult to remove the polymer from the test tube after it has formed.

1.3 Uncertainties in any Measurements

N/A

2 Results and Observations

As the reaction progresses the reaction mixture becomes more viscous until a translucent solid is left in the test tube by the end of the experiment.

2.1 Processed Results

N/A

2.2 Calculations

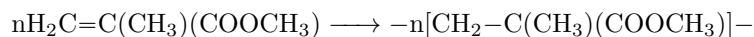
N/A

2.3 Uncertainty in Final Answer

N/A

3 Conclusions Drawn

As the reaction progresses the monomers polymerise to form longer chain polymers. As the chain length of the polymers increases; the London forces of attraction between the polymer chains increase in strength, hence increasing the viscosity of the polymer.



The polymer produced in the reaction is poly(methyl methacrylate) also known as PMMA or Perspex and is often used as a shatterproof replacement for glass.

The reaction progresses via a free radical mechanism (free radical vinyl polymerisation).

4 Evaluation

4.1 Systematic Errors

N/A

4.2 Uncertainties

N/A