OCR (B) Chemistry A-Level

PAG 05b - Synthesis of an organic liquid Preparation of cyclohexene

Flashcards

Write the word and chemical equations for the reaction that takes place when cyclohexanol is dehydrated

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Cyclohexanol → cyclohexene + water

$C_6H_{11}OH \rightarrow C_6H_{10} + H_2O$

What is the role of phosphoric acid in the dehydration of alcohols?

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Catalyst (speeds up the rate of reaction)

When an alcohol is dehydrated, why do 2 layers form in the separating funnel?

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The aqueous and organic layers have different densities and they are immiscible

Why is it important to open the stopper of the separating funnel regularly?

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Release the build up of pressure and reduce the risk of apparatus breaking

Cyclohexene can be produced from cyclohexanol. Why is sodium chloride added to mixture before it is separated with a separating funnel?

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To help remove most of the water from the solution

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To remove the final traces of water - acts as a drying agent

When cyclohexene is produced from cyclohexanol, is reflux or distillation apparatus used?

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Reflux

In the purification of the crude cyclohexene, is reflux or distillation apparatus used?

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Distillation

What is the purpose of anti-bumping granules?

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To prevent the formation of large gas bubbles that cause violent boiling.

During distillation, anti-bumping granules prevents the mixture boiling over into the condenser meaning impurities won't contaminating the product.

Describe the key features of the apparatus set-up for distillation

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- Tilt the condenser down so any liquids flow into the beaker
- The water must enter at the bottom of the condenser and leave at the top for efficient cooling
- The collection flask should not be sealed to the condenser - it should not be airtight as the hot air in the system could cause the apparatus to crack
- Use a thermometer to identify when the desired product has evaporated from the reaction mixture

How can percentage yield be calculated?

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(Maximum theoretical yield ÷ actual yield) x 100

Describe the chemical test for an alkene

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Add bromine water. If an alkene is present, there will be a colour change from orange to colourless.

Why might a water bath or electric heater be used instead of a Bunsen burner to heat a reaction mixture?

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If the reactants are flammable as using a Bunsen burner would be a safety risk

What safety precautions should be taken when carrying out this practical?

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- Cyclohexanol is harmful if inhaled or swallowed so keep lab well ventilated
- Concentrated phosphoric acid causes severe skin and eye burns so wear safety goggles and gloves when handling
- Anhydrous calcium chloride causes serious eye irritation so wear safety goggles
- Cyclohexene is fatal if swallowed so wash hands after use. It is also flammable so keep away from naked flames.
- Ensure the separating funnel stopper is firmly held in place and point the nozzle away from others when shaking