

Edexcel International Chemistry A Level

CP6 - Chlorination of 2-methylpropan-2-ol with Concentrated Hydrochloric Acid

Flashcards

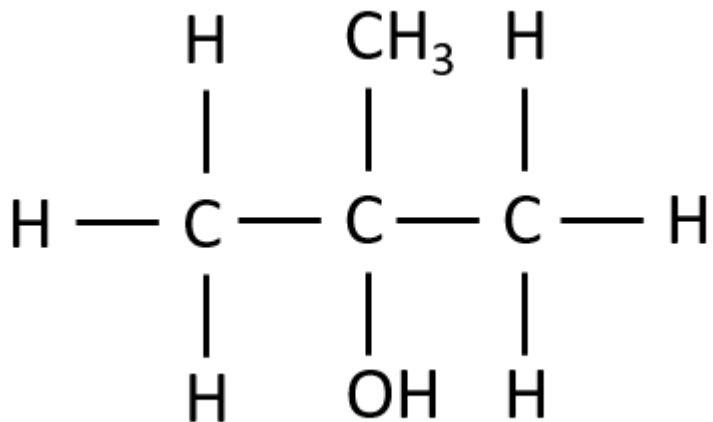
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Draw the structure of
2-methylpropan-2-ol



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What safety precautions should be taken when chlorinating 2-methylpropan-2-ol using concentrated hydrochloric acid?



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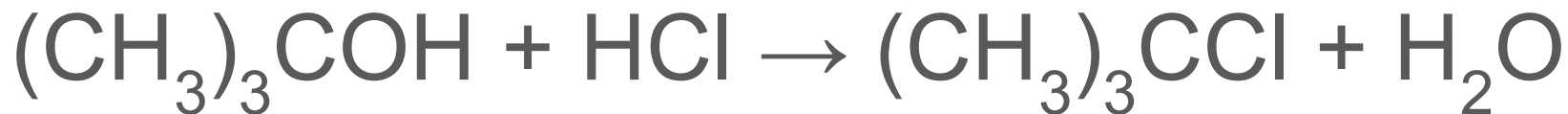
- Wear safety goggles and gloves.
- 2-methylpropan-2-ol and 2-chloro-2-methylpropane are flammable so keep away from open flames. 2-methylpropan-2-ol is harmful.
- Calcium chloride is an irritant so avoid contact with skin.
- Concentrated hydrochloric acid is corrosive so avoid contact with skin. HCl fumes are toxic and corrosive so carry out the experiment in a fume cupboard.



Write an equation for the reaction
between 2-methylpropan-2-ol and
hydrochloric acid



Write an equation for the reaction between
2-methylpropan-2-ol and hydrochloric acid



2-methylpropan-2-ol and hydrochloric acid are reacted together. Why is anhydrous calcium chloride added to the mixture once the reaction is complete?



2-methylpropan-2-ol and hydrochloric acid are reacted together. Why is anhydrous calcium chloride added to the mixture once the reaction is complete? To ensure that any unreacted alcohol is in the lower aqueous layer rather than in the organic layer containing the product.



What is used to separate a mixture containing immiscible aqueous and organic substances?



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Separating funnel



2-methylpropan-2-ol and hydrochloric acid are reacted together. Why is sodium hydrogencarbonate solution added to the organic mixture once the reaction is complete?



2-methylpropan-2-ol and hydrochloric acid are reacted together. Why is sodium hydrogencarbonate solution added to the organic mixture once the reaction is complete?

To remove any unreacted HCl



Write a balanced chemical equation for the reaction between hydrochloric acid and sodium hydrogencarbonate (NaHCO_3)



Write a balanced chemical equation for the reaction between hydrochloric acid and sodium hydrogencarbonate (NaHCO_3)



When producing
2-chloro-2-methylpropane from
2-methylpropan-2-ol and hydrochloric
acid, sodium hydrogencarbonate is used
to remove any unreacted HCl. Why isn't
a strong base used?



When producing 2-chloro-2-methylpropane from 2-methylpropan-2-ol and hydrochloric acid, sodium hydrogencarbonate is used to remove any unreacted HCl. Why isn't a strong base used?

A stronger base (such as NaOH) would react with the halogenoalkane product. Hydrolysis of this product would cause the alcohol to be reformed.



2-methylpropan-2-ol and hydrochloric acid are reacted together. Why is anhydrous sodium sulfate added to the organic layer after any unreacted HCl has been removed?



2-methylpropan-2-ol and hydrochloric acid are reacted together. Why is anhydrous sodium sulfate added to the organic layer after any unreacted HCl has been removed?

To remove any traces of water from the mixture. Sodium sulfate is a drying agent.



By what method can an impure liquid product be purified?



By what method can an impure liquid product be purified?

Distillation



Describe the process of purifying a product using distillation



Describe the process of purifying a product using distillation

1. Place the impure product in a pear-shaped flask. Connect this to a horizontal condenser (water should enter at the bottom and leave at the top). A thermometer may be placed above the flask. Make sure there is a beaker at the end of the condenser.
2. Heat the pear-shaped flask with a bunsen burner or heating mantle.
3. The product will evaporate when it warms to its boiling point (measured using the thermometer). The vapours are then condensed in the condenser and collected in the beaker.



How can the purity of a substance be checked?



How can the purity of a substance be checked?

By measuring its melting or boiling point

A pure substance has a precise melting / boiling point while an impure substance melts/boils over a larger range of temperatures.

