Reaction of Halogenoalkanes with Aqueous Alkali

Sam White 13A

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1.0.1

Revision History

Revision	Date	Author(s)	Description
1.0.0	09.11.2016	Sam White	Initial Version
1.0.1	10.11.2016	Sam White	Corrected 2-chloro-2-methylpropane chemical formula

1 Sequential Method

1. Add $1\,\mathrm{cm}^3$ of 20 % potassium hydroxide in ethanol to a test tube followed by $1\,\mathrm{cm}^3$ of water and $0.5\,\mathrm{cm}^3$ of 2-chloro-2-methylpropane.
2. Shake the test tube side-to-side for one minute.
3. Add $1\,\mathrm{cm}^3$ of $2\,\mathrm{mol\,dm}^{-3}$ nitric acid and test the solution with blue litmus paper to ensure it is acidic.
4. Add a few drops of $0.02\,\mathrm{mol\,dm}^{-3}$ of silver nitrate and observe the result.

1.1 Diagram

N/A

1.2 Reasons for Method

- The nitric acid is used to neutrilise the potassium hydroxide such that a precipitate of silver hydroxide doesn't form, hence allowing the test for chloride ions to be definitive.

- The potassium hydroxide is aqueous such that nucleophillic substitution is favoured over elimination which would be favoured if the solution was ethanolic instead such due to the stabilisation effect on the hydroxide ions.

1.3 Uncertainties in any Measurements

N/A

2 Results and Observations

After the silver nitrate solution has been added a white precipitate forms.

2.1 Processed Results

N/A

2.2 Calculations

N/A

2.3 Uncertainty in Final Answer

N/A

3 Conclusions Drawn

The precipitate of silver chloride forms due to chloride ions released as the nucleophillic substitution reaction progresses and the chlorine atoms in the 2-chloro-2-methylpropane are substituted by the hydroxide ions. This results in the formation of an alcohol.

$$CH_3C(CH_3)(Cl)CH_3 + OH^- \longrightarrow CH_3C(CH_3)(OH)CH_3 + Cl^-$$

4 Evaluation

4.1 Systematic Errors

N/A

4.2 Uncertainties

N/A