AQA Chemistry A-level

Required Practical 6

Tests for alcohol, aldehyde, alkene and carboxylic acid

Test for an alcohol: metal

1. Add a small piece of metallic sodium to alcohol.
2. Produces hydrogen gas which is shown by ‘squeaky pop’ test.
3. Dispose any excess sodium safely using the beaker of ethanol provided. (Sodium will completely react with the excess ethanol in order to be safely washed away because if any water comes into contact with the sodium there is a serious fire risk).

Test for an alcohol: potassium dichromate

1. To determine between alcohols, add acidified potassium dichromate to the solution.
2. Primary and secondary alcohols will reduced from orange dichromate(VI) ions to green chromium(III) ions.
3. It will remain orange if a tertiary alcohol is present.

Test for an aldehyde: Fehling’s solution

1. In a clean test tube mix together equal volumes of Fehling's solution A (blue aqueous solution of copper(II) sulfate pentahydrate crystals) and Fehling's solution B (clear solution of aqueous potassium sodium tartrate and a strong alkali). The resultant Fehling's test reagent should be a clear dark blue solution.
2. Add 5 drops of this test reagent to a test tube along with a few anti-bumping granules, then add the aldehyde.
3. Warm gently for around two minutes in a beaker of hot water, gradually bring the beaker of water to boiling and maintain this temperature for a few minutes.
4. Carefully lift the test tube out of the boiling water and allow its contents to stand for several minutes.
5. A brick red precipitate formed if an aldehyde is present.

Test for an alkene: bromine water

1. Add about 1 cm^3 of bromine water to 2 drops alkene.
2. Shake the contents of the tube vigorously from side to side.
3. Bromine water decolourised from orange if an alkene is present.

Test for a carboxylic acid: sodium carbonate

1. Place spatula of solid sodium carbonate in a test tube and add about 2 cm^3 of dilute ethanoic acid using a pipette.
2. Collect the gas produced and bubble through limewater (calcium hydroxide). It will turns cloudy if a carboxylic acid is present as CO_2 is produced.

(Phenols are also acidic but are not sufficiently acidic to react with carbonates.)

Test for a halogenoalkane: sodium hydroxide and silver nitrate

1. Using a teat pipette, add 5 drops of 1-bromobutane to about 1cm^3 of sodium hydroxide solution in a test tube. (OH- ions replace the Br by nucleophilic substitution).
2. Warm the contents of the test tube for a few minutes in a beaker filled with hot water at approximately 60°C.
3. Acidify the contents of the test tube by adding 2cm^3 of dilute nitric acid and then add about 1cm^3 of silver nitrate solution. (Nitric acid removes carbonate and hydroxide impurities which would form precipitates. Silver Bromide precipitate then forms).