
A-level Chemistry exemplar for required practical 6

Tests for alcohol, aldehyde, alkene and carboxylic acid:

To carry out tests for the presence of organic functional groups and to make accurate observations.

Student sheet

Requirements

You are provided with the following:

- ethanol
- ethanal or propanal
- cyclohexene
- 1-bromobutane
- dilute ethanoic acid
- small pieces of metallic sodium under petroleum ether (a beaker of ethanol should be available for safe disposal of any excess sodium)
- Fehling's solution A
- Fehling's solution B
- bromine water
- sodium carbonate solution
- sodium hydrogencarbonate solid
- sodium hydroxide solution
- silver nitrate solution (0.05 mol dm^{-3})
- dilute nitric acid
- 250 cm^3 beaker
- anti-bumping granules
- test tubes, boiling tubes and a test-tube holder
- thermometer
- plastic graduated dropping pipettes.

Suggested method

This experiment is divided into five parts.

In every case, you should present **all** of your observations in a neat table. The presentation of a clearly organised record of your observations is an important skill which you **will** be expected to demonstrate as part of this assessment.

Part 1 – A test for an alcohol

- To about 1 cm^3 of ethanol in a **dry** test tube, add a **small** piece of metallic sodium.
- Record your observations.
- Make sure that you dispose safely of any excess sodium using the beaker of ethanol provided.

Part 2 – A test for an aldehyde using Fehling's solution.

- a) In a clean test tube mix together equal volumes of Fehling's solution A and Fehling's solution B. The resultant Fehling's test reagent should be a clear dark blue solution.
- b) Add 5 drops of this test reagent to about 1 cm³ of sodium carbonate solution in a test tube containing a few anti-bumping granules and then add about 1 cm³ of ethanal (or propanal) to this same test tube.
- c) Warm the test tube gently for approximately 2 minutes in a beaker half-filled with hot water and then gradually bring the beaker of water to boiling and maintain this temperature for a few minutes.
- d) Using the test tube holder, carefully lift the test tube out of the boiling water and allow its contents to stand for several minutes. Record your observations.

Part 3 – A test for an alkene (a test for unsaturation)

- a) To about 2 drops of cyclohexene in a test tube, add about 1 cm³ of bromine water and shake the contents of the tube vigorously from side to side.
- b) Record your observations.

Part 4 – A test for a carboxylic acid

- a) Place one small spatula measure of solid sodium hydrogencarbonate in a boiling tube and add to it about 2 cm³ of dilute ethanoic acid.
- b) Record your observations.

Part 5 – A test for a halogenoalkane

- a) Using a test pipette, add 5 drops of 1-bromobutane to about 1 cm³ of sodium hydroxide solution in a test tube. Warm the contents of the test tube for a few minutes, by placing it into a beaker filled with hot water at approximately 60 °C.
- b) Acidify the contents of the test tube by adding 2 cm³ of dilute nitric acid and then add about 1 cm³ of silver nitrate solution.
- c) Record your observations.