

# NEATH PORT TALBOT COLLEGE COLEG CASTELL NEDD PORT TALBOT

## School of Maths & Science Science Practical

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### Functional Group Tests For Organic Compounds

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#### ◆ Aim

To carry out reactions on organic compounds which enable you to identify the functional group present.

#### ◆ Introduction

Organic compounds have characteristic reactions which one is able to use to identify the functional group present in the organic compound.

#### ◆ Safety



#### Control Measures

- The wearing of **safety glasses** and a **laboratory coat** at all times will be sufficient to take account of most hazards and significant risks.
- All waste is to be placed in the labelled container immediately after use.
- You are reminded of the need of good laboratory practice in order to maintain a safe working environment.
- Keep Flammable liquids away from flames.



#### Hazards

**(Highly) Flammable** Cyclohexene, Ethanol, Propan-1-ol



#### Corrosive

Nitric acid, Potassium Dichromate, Silver Nitrate solution, Bromine



#### Harmful/Irritant

1-Bromobutane, 1-chlorobutane, Cyclohexene, Silver Nitrate solution, bromine, potassium Manganate (VII) solution.



#### Toxic

Bromine

**POTASSIUM MANGANTAE (VII) AND SILVER NITRATE SOLUTION  
STAIN THE SKIN.**

◆ Procedure 1

**CARRY OUT ALL REACTIONS IN FUME CHAMBER**

1. **Reactions of C=C (Alkenes)**

- (i) Reaction of aqueous bromine, Br<sub>2(aq)</sub>.

Place the cyclohexene (1cm<sup>3</sup>) in a test tube. Add dropwise the bromine solution - shake.

Observations;

Equation;

Type of reaction;

Equation using ethane;

Equation using propene;

- (ii) Reaction with potassium manganate (VII) solution, KMnO<sub>4(aq)</sub>, in acid, dilute H<sub>2</sub>SO<sub>4</sub>. (Acidified potassium manganate (VII)). This is a purple solution. (In the syllabus it states reaction with aqueous Mn<sup>vii</sup>). To the alkene add the acidified KMnO<sub>4</sub>, shake and heat.

Observations;

Equation;

Equation with ethane;

Equation with propene;

◆ Procedure 2

**Reactions of primary alcohols. (-OH). e.g. ethanol, propan-1-ol**

The following reactions may be vigorous - carry out in fume chamber.

- (i) To ethanol (1cm<sup>3</sup>), add 1cm<sup>3</sup> of acidified potassium manganate (VII) solution and warm using a water bath.

Observations;

Equation;

Type of reaction;

- (ii) Repeat the above the reaction with prop an-1-ol.

Observations;

Equation;

- (iii) To ethanol (1cm<sup>3</sup>), add 1cm<sup>3</sup> of acidified potassium dichromate (VI) solution and warm using a water bath.

Observations;

Equation;

Type of reaction;

- (iv) Repeat the above the reaction with propan-1-ol.

Observations;

Equation;

### ◆ Procedure 3

Reaction of carboxylic acids (-COOH).

Use ethanoic acid as the carboxylic acid.

Add either sodium carbonate solution,  $\text{Na}_2\text{CO}_3$  or sodium hydrogen carbonate,  $\text{NaHCO}_3$ , or you can add solid  $\text{Na}_2\text{CO}_3$  or  $\text{NaHCO}_3$  to the carboxylic acid or to a solution of the carboxylic acid in water. Test any gas given off by passing the gas through limewater solution.

Observations;

Name the gas evolved;

Equation;

Type of reaction;

◆ Procedure 4

**Hydrolysis of Halogenoalkanes**

**For example  $\text{CH}_3\text{CH}_2\text{X}$  where X is Cl, Br or I.**

**Test 1.** Take 5 drops of the halogenoalkanes and add  $1\text{ cm}^3$  of dilute NaOH solution. (HYDROLYSIS). Add dilute  $\text{HNO}_3$  to neutralise the excess NaOH and then add dilute silver nitrate,  $\text{AgNO}_3$ , solution.  
(This is the test for the presence of a halide ion).

Sample	Observation	Inference
A		
B		
C		

**Test 2.** Add a few drops of dilute ammonia and concentrated ammonia solution to each of the samples A B and C and record your results below.

Sample	Dilute Ammonia	Conc Ammonia	Inference
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