

# WJEC (Wales) Chemistry A-level

## SP 2.6 - Nucleophilic Substitution Reaction

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## SP 2.6 - Nucleophilic Substitution Reaction

### Aim

To prepare a **pure sample** of butan-1-ol from 1-bromobutane and sodium hydroxide.

### Apparatus and Chemicals

- 100 cm<sup>3</sup> round bottom flask
- 100 cm<sup>3</sup> beaker
- 100 cm<sup>3</sup> conical flask
- 25 cm<sup>3</sup> measuring cylinder
- Reflux condenser
- Thermometer
- Specimen tube
- Labels/suitable pen
- Anti-bumping granules
- Heating mantle / Bunsen burner with water bath
- Clamp stand
- 0.1 mol dm<sup>-3</sup> NaOH solution
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>Br (1-bromobutane)

### Safety Considerations

- ★ CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>Br - flammable, irritant
- ★ 0.1 mol dm<sup>-3</sup> NaOH solution - irritant



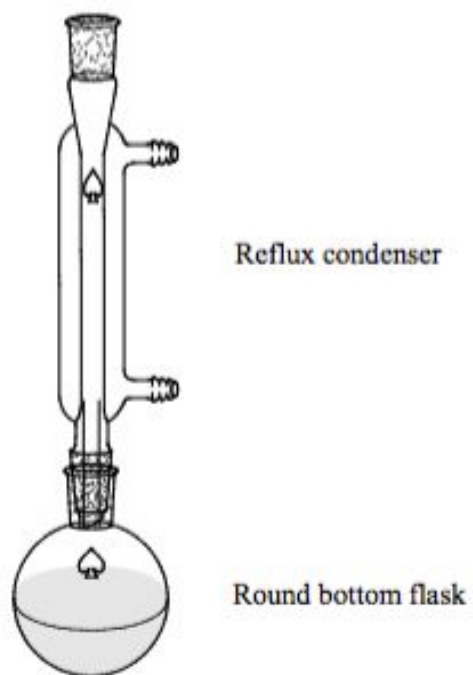
### Method

1. Measure 25 cm<sup>3</sup> of CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>Br using a measuring cylinder and decant to a round bottomed flask. This step should be performed in the **fume cupboard**.
2. Add 25 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> NaOH solution and a few **anti-bumping granules** into the **round bottom flask**. This step should be performed in the fume cupboard.
3. Swirl the flask gently to mix the reagents and set up the **reflux condenser apparatus**.
4. Turn on the water to run through the condenser.
5. Turn on the heating mantle (or heat the water bath with a Bunsen burner) and heat the solution to reflux for 15 minutes.
6. Rearrange the apparatus for **distillation** (diagram 2).
7. Distil off the CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>OH produced. Collect in a clean, dry 100 cm<sup>3</sup> conical flask.
8. Record the temperature at which the liquid product is collected.



## Diagrams

### Reflux Apparatus:



### Distillation Apparatus:

