WJEC (Eduqas) Chemistry A-level

SP OA2.2 - Identification of Aldehydes/Ketones by their Reaction with 2,4-Dinitrophenylhydrazine

Methods and images taken from the WJEC practical handbook

SP OA2.2 - Identification of Aldehydes/Ketones by their Reaction with 2,4-Dinitrophenylhydrazine

Aim

To use **2,4-dinitrophenylhydrazine** (2,4-DNPH) to identify **aldehydes** and **ketones**.

Apparatus and Chemicals

- 5 x Pasteur pipette
- 2 x spatula
- 4 x boiling tube
- Test-tube rack
- 100 cm^3 beaker
- 250 cm^3 beaker
- 10 cm^3 measuring cylinder
- 100 cm^3 conical flask
- Hot water bath
- Buchner funnel
- Suction apparatus
- Filter paper
- Melting point apparatus (or Thiele tube)
- Capillary tube
- 2,4-DNPH
- 1.0 mol dm^{-3} H_2SO_4
- Butanone ($CH_3CH_2COCH_3$)
- Benzaldehyde (C_6H_5CHO)
- CH_3CH_2OH

Safety Considerations

- ★ 2,4-DNPH - flammable, toxic
- ★ $CH_3CH_2COCH_3$ - flammable, irritant
- ★ C_6H_5CHO - harmful
- ★ 1.0 mol dm^{-3} H_2SO_4 - irritant
- ★ CH_3CH_2OH - highly flammable

Method

1. Add about **1 cm depth** of $CH_3CH_2COCH_3$ to a **boiling tube**.
2. Using a measuring cylinder, carefully add 8 cm^3 of **2,4-DNPH** solution to the boiling tube.
3. If a precipitate does not form, carefully add dilute sulfuric acid dropwise until a **precipitate is formed**.
4. Filter the mixture under **reduced pressure** to isolate the solid derivative.
5. Purify the derivative by **recrystallisation** from the minimum amount of hot ethanol.
6. Filter the purified derivative under **reduced pressure**.
7. **Dry** a small sample of the derivative by pressing between filter papers.
8. Obtain a **melting point** for this sample.
9. Repeat steps 1-8 with C_6H_5CHO.