WJEC (Wales) Chemistry A-level

SP 3.2b - Estimation of Copper in Copper(II) Salts

Methods and images taken from the WJEC practical handbook

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Aim

To determine the **percentage by mass** of copper in copper(II) sulfate crystals.

Apparatus and Chemicals

- Access to a 3 decimal place mass balance (minimum 2 decimal place)
- Weighing boat
- 2 x 50 cm^3 beakers
- 250 cm^3 beaker
- 3 x 250 cm^3 conical flask
- 250 cm^3 volumetric flask with stopper
- 25 cm^3 bulb pipette
- Pipette filler
- Burette, funnel and stand
- White tile
- Wash bottle of deionised water
- 2 x Pasteur pipettes
- $CuSO_4.5H_2O$ crystals
- 0.1 mol dm^{-3} $Na_2S_2O_3$ solution
- 0.2% starch solution
- KI powder

Safety Considerations

- ★ $CuSO_4.5H_2O$ crystals - harmful, dangerous to the environment
- ★ KI powder - irritant

Method

1. **Accurately** weigh out about 6 g copper(II) sulfate crystals into a weighing boat.
2. Use the copper(II) sulfate crystals to make up 250 cm^3 of **standardised solution** of copper(II) sulfate.
3. Pipette 25 cm^3 of this solution into a conical flask.
4. Add 1.5 g potassium iodide and swirl thoroughly.
5. **Titrate** this solution with standard 0.1 mol dm^{-3} $Na_2S_2O_3$ in a burette. When the iodine colour fades, add 1 cm^3 starch indicator.
6. Use your titration data to calculate the **percentage by mass** of copper in the copper(II) sulfate crystals.