WJEC (Wales) Chemistry A-level

SP 3.2a - Simple Redox Titration

Methods and images taken from the WJEC practical handbook

SP 3.2a - Simple Redox Titration

Aim

To determine the **relative molecular mass** of an iron(II) salt by **titration** with **standard solution** of potassium manganate(VII).

Apparatus and Chemicals

- Access to 3 decimal place mass balance (minimum 2 decimal place)
- Safety goggles
- 50 cm^3 burette and funnel
- 25 cm^3 pipette and filler
- 250 cm^3 conical flasks
- 250 cm^3 volumetric flask
- Unknown iron(II) salt
- 1.0 mol dm^{-3} H_2SO_4 solution
- Standardised $KMnO_4$ solution (approximately 0.02 mol dm^{-3})

Safety Considerations

★ 1.0 mol dm^{-3} H_2SO_4 solution - irritant
★ $KMnO_4$ solution - harmful, oxidising

Method

1. Weigh out **accurately**, about 9.8 g of the iron(II) salt provided and record the mass.
2. Make the salt up to 250 cm^3 of a **standard solution** in H_2SO_4 solution.
3. Titrate 25 cm^3 portions of this solution against the standardised $KMnO_4$ solution.
4. Use your results to calculate the **relative molecular mass** of the iron(II) salt.

The overall equation for the redox reaction can be used to help calculate the relative molecular mass of the iron(II) salt:

$$MnO_4^- + 8H^+ + 5Fe^{2+} \rightarrow Mn^{2+} + 5Fe^{3+} + 4H_2O$$