

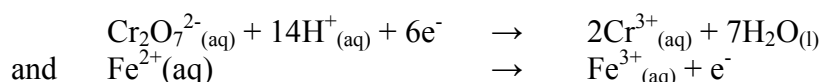
CHEMISTRY

Lab 12: Iron content in hydrated FeSO₄ crystals

Part A: dichromate or chromate (VI)

An acidified solution of chromate (VI) ions is a strong oxidizing agent and can oxidize iron (II) ions to iron (III) ions.

The two relevant half-equations are:

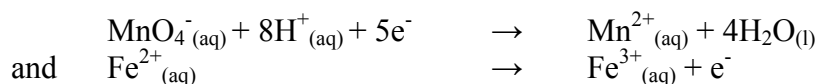


Weigh out accurately about 2.5 grams of hydrated iron (II) sulfate [FeSO₄] crystals and dissolve them in about 40 cm³ of sulfuric acid solution of concentration 1 mol dm⁻³. Pour in a volumetric flask, make up to 100 cm³ with deionized water and thoroughly mix the solution. Pipette 10 cm³ of this solution into a conical flask, add about an equal volume of distilled water and titrate with 0.0200 mol dm⁻³ of potassium chromate (VI) [K₂Cr₂O₇] solution until a color change is observed. Note down the color change and explain it.

Part B: permanganate or manganate (VII)

An acidified solution of manganate (VII) ions is a strong oxidizing agent and can oxidize iron (II) ions to iron (III) ions.

The two relevant half-equations are:



Pipette 10 cm³ of the hydrated iron (II) sulfate [FeSO₄] solution into a conical flask, add about an equal volume of distilled water and titrate with 0.0200 mol dm⁻³ of potassium manganate (VII) [KMnO₄] solution until a color change is observed.

1. Note down the color change and explain it.
2. Derive the overall equation for the reaction.
3. Using your titration results, find the mass percentage of iron in the hydrated iron (II) sulfate crystals.
4. Find the complete chemical formula of the hydrated iron (II) sulfate crystals from the reagent bottle and calculate what the mass percentage of iron should be.
5. Compare your answer with the correct value and comment on your result.