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Aim :-

To perform the chemical assay of Ferrous Sulphate.

Reference :-

Requirements:

(a) Glasswares : Conical flask, beaker, burette, measuring cylinder, funnel, glass rod, dropper etc.

(b) Reagents :- Ferrous sulphate (1g), 0.1 N potassium permanganate ($KMnO_4$), dil. sulphuric acid.

Reagent Preparation :

0.1 N $KMnO_4$: Dissolve 3.3g of reagent grade potassium permanganate ($KMnO_4$) in 1 L of purified water and heat on a steam bath for two hours. Cover and allow standing for 24 hours.

Principle :

It is assayed by redox titrations.

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In the reaction of chemical assay, ferrous sulphate is oxidised to ferric sulphate and the electron released during oxidation is helpful in the reduction of manganese ion from Mn^{+7} to Mn^{+2}. Hence $KMnO_4$ (potassium permanganate) here is used as an oxidising agent.

$$Fe^{+2} \longrightarrow Fe^{3+} + e^-$$

Ferrous ion — Ferric ion

$$Mn^{+7} + 5e^- \rightarrow Mn^{+2}$$

(From $KMnO_4$) — (From $MnSO_4$)

Overall reaction is

$$10FeSO_4 + 2KMnO_4 + 8H_2SO_4 \rightarrow K_2SO_4 + 2MnSO_4 + 5Fe_2(SO_4)_3 + 8H_2O$$

OR

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

Procedure.

1. Wash and dry all glasswares before use.
2. Prepare Standard Solution

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Observation

S.No.	Initial reading	final reading	Volume consumed.
1.	0	7.5	7.5
2.	7.5	15.0	7.5
3.	15.0	22.5	7.5

$$\text{Avg} = \frac{7.5 + 7.5 + 7.5}{3} = 7.5 \text{ ml.}$$

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(i) Take 1.58 gm of potassium permanganate and dissolve it in 500 ml of distilled water.

(ii) Heat the solution for some time for complete dissolution.

3. Preparation of sample solution.

(i) Take 1 gm of ferrous sulphate and dissolve it in 25 ml of distilled water.

(ii) Add 20 ml of dil. H_2SO_4 in it.

4. Take 10 ml of sample sol^n and titrate against standard solution.

Result:

Assay of ferrous sulphate has been performed successfully in laboratory.

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