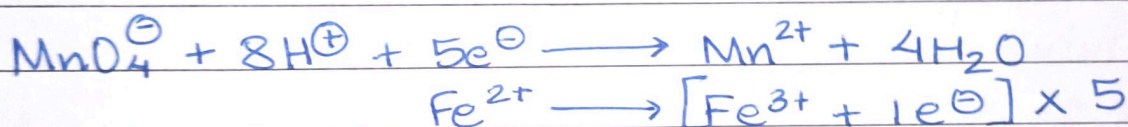


- Aim: Prepare M/20 solution of Ferrous ammonium sulphate (Mohr's salt). Using this solution, find out the molarity & strength of the given  $\text{KMnO}_4$  solution. You are provided with 2g of  $\text{KMnO}_4$ .

Chemical Equation

Ionic equation



Indicator

$\text{KMnO}_4$  is a self indicator

End Point

Colourless to permanent pink colour ( $\text{KMnO}_4$  in burette).

Procedure

1. Prepare 200 mL of M/20 Mohr's salt solution by dissolving 3.92g of Mohr's salt in water. Rinse the pipette with the M/20 Mohr's salt solution and pipette out 10.0 mL of it in a washed titration flask.
2. Rinse and fill the burette with the given  $\text{KMnO}_4$  sol<sup>n</sup>.



### Observation —

S.No.	Volume of Mohr's salt sol <sup>n</sup> (mL)	Burette Reading		Volume of $\text{KMnO}_4$ sol <sup>n</sup> (mL)
		Initial	Final	
1	10	0.0	10.1	10.1
2	10	10.1	20.2	10.1

Concordant value = 10.1 mL

$M_1$  (Molarity of Mohr's salt sol<sup>n</sup>) =  $\frac{1}{20} \text{ M}$

$M_2$  (Molarity of  $\text{KMnO}_4$  sol<sup>n</sup>) =  $0.009 \text{ mol L}^{-1}$

$V_1$  (Volume of Mohr's salt sol<sup>n</sup>) = 10 mL

$V_2$  (Volume of  $\text{KMnO}_4$  sol<sup>n</sup>) = 10.1 mL

a (no. of electrons in oxidation) = 1

b (no. of electrons in reduction) = 5

### Calculation —

(a) Molarity of unknown  $\text{KMnO}_4$  using

$$aM_1V_1 = bM_2V_2$$

$$M_2 = \frac{aM_1V_1}{V_2}$$

$$= \frac{1 \times 0.05 \times 10}{5 \times 10.1} = \underline{\underline{0.009 \text{ M}}}$$

(b) Strength of given  $\text{KMnO}_4$

= Molarity  $\times$  molar mass of  $\text{KMnO}_4$

$$= 0.009 \times 158 = \underline{\underline{1.42 \text{ g mol}^{-1}}}$$

(c) % Purity of given  $\text{KMnO}_4$

$$= \frac{\text{Strength of given } \text{KMnO}_4}{\text{approx. strength}} \times 100 = \frac{1.42}{2} \times 100 = \underline{\underline{71\%}}$$



3. Add  $\frac{3}{4}^{\text{th}}$  of test tube of dilute sulphuric acid to the solution in titration flask.
4. Note the initial reading of the burette.
5. Now add  $\text{KMnO}_4$  solution from the burette till a permanent light pink colour is imparted to the solution in the titration flask on addition of last single drop of  $\text{KMnO}_4$  solution.
6. Note the final reading of the burette.

Result —

- (i) Molarity of the given  $\text{KMnO}_4 = 0.009 \text{ mol L}^{-1}$
- (ii) Strength of the given  $\text{KMnO}_4 = 1.42 \text{ g L}^{-1}$
- (iii) % Purity of the given  $\text{KMnO}_4 = 71\%$