

Exercise - Find % Purity of impure sample of Mohr's salt, 25.6 gm of which dissolve in 1L solution. Prepare the standard solution M/50 $KMnO_4$.

Apparatus Required - Burette, Pipette, beakers, flask, funnel, weighing balance and weight box, white tile.

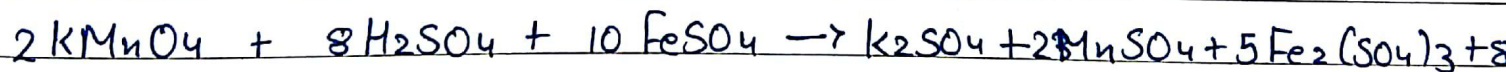
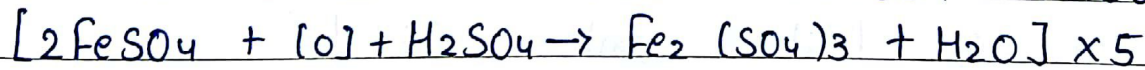
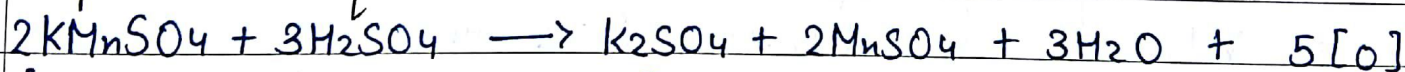
Chemical used -

Mohr's salt, $KMnO_4$, Conc. H_2SO_4 , Dil. H_2SO_4 .

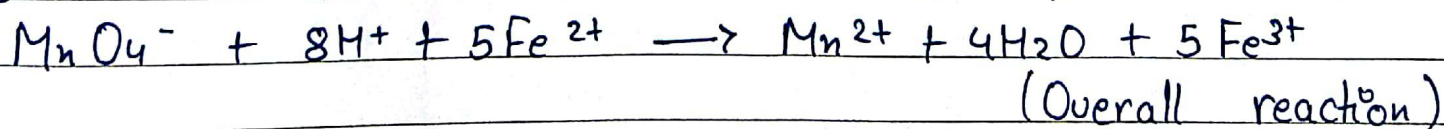
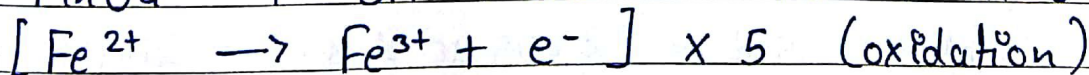
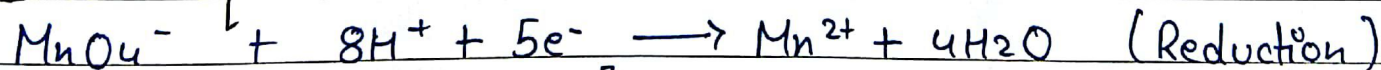
Indicator - $KMnO_4$ acts as self indicator.

Theory - $KMnO_4$ acts as oxidising agent in the presence of H_2SO_4 while Mohr's salt acts as reducing agent.

Molecular Equation -



Ionic Equation -



Preparation of standard M/50 $KMnO_4$ Solution.

Molar mass of KMnO_4 solution = 158 g

gms of KMnO_4 required for $\frac{M}{50} = \frac{158}{50}$ g

For 250 ml solution = $\frac{158 \times 250}{50 \times 1000} = \frac{158}{200} = 0.79$ gm.

Take 0.79 gms of KMnO_4 in 250 ml volumetric flask and add water to make solution and the finally mark upto 250 ml.

End Point - From colourless to light Pink.

Result - The molarity, strength and % Purity of impure Mohr's salt is 0.0540 M, 21.168 gm/l and 82.68 %.

Precautions -

i - Upper meniscus of burette should be read.

ii - Do not heat the solution.

iii - Remove the funnel from burette while performing titration.

Observation Table - Titration between $M/50$ $KMnO_4$ Solution and unknown Mohr's salt.

S.No	Volume of Pipette Solution (V_2) ml	Volume of Burette Solution		Volume of $KMnO_4$ (V_1)	Concordant Reading.
		Initial	Final		
1.	20	0.0	10.9	10.9	10.8
2.	20	0.0	10.8	10.8	
3.	20	0.0	10.8	10.8	

Calculations -

Formula used

$$5 \times M_1 V_1 = M_2 V_2$$

$$M_2 = \frac{M_1 V_1 \times 5}{V_2}$$

M_1 = Molarity of $KMnO_4$ ($1/50$)

M_2 = Molarity of Mohr's salt

V_1 = Volume of $KMnO_4$ (10.8 ml)

V_2 = Volume of Mohr's salt (20 ml)

$$M_2 = \frac{1 \times 10.8 \times 5}{50 \times 20} = 0.0540 \text{ M}$$

Strength of Mohr's salt = $0.0540 \times 392 = 21.168 \text{ gm/L}$

% purity of Mohr's salt = $\frac{21.168}{25.6} \times 100 = 82.68 \%$