Experiment (6)

Oxidation-Reduction reactions

- Oxidation-reduction reactions: are all the reactions involving change in oxidation number or transfer of electrons among the reacting substances. Examples: Ferrous, stannous compounds, sodium thiosulphate and oxalate ion.
- Reduction agent: is one that losses electrons and is oxidized to a higher valiancy conditions

$$C_2 O_4^= \rightarrow 2CO_2 + 2e^-$$

eq.wt $C_2 O_4^= = \frac{M.wt C_2 O_4^=}{No. of \ electrons \ lost} = \frac{134}{2} = 67 \ g/eq$

• Oxidation agent: is one that gains electrons and is reduced to a lower valiancy conditions. Examples: Potassium dichromate, potassium permanganate.

$$MnO_{4}^{-} + 8H^{+} + 5e^{-} \rightarrow Mn^{+2} + 4H_{2}O$$

$$eq.wt MnO_{4}^{-} = \frac{M.wtMnO_{4}^{-}}{No. of \ electrons \ gianed} = \frac{158.03}{5}$$

$$= 31.6 \ g/eq$$

Preparation of solutions:

A: Preparation of 0.1N potassium permanganate.

- 1. Weigh about 3.2gm of KMnO₄, and transfer it to a 1500mL beaker and add I L distilled water.
- 2. Cover the beaker with a clock glass then heat the solution to boiling, boil gently for 1 hr. and allow the solution to cool to the laboratory temperature.
- 3. Filter the solution through a funnel containing a plug of purified glass wool; collect the filtrate in a vessel.
- 4. The solution should be stored in a clean, glass stoppered bottle of a dark-brown-colored glass and kept in the dark.

Lab.7

B: Preparation of 0.1N sodium oxalate (Na₂C₂O₄).

Weigh about 1.675gm of $Na_2C_2O_4$ and dissolved it in distilled water in a 250 mL volumetric flask.

Standardization of permanganate solution with oxalate ion:

- 1. Pipet 10 mL of 0.1 N of sodium oxalate $(Na_2C_2O_4)$ in a 250 mL conical flask .
- 2. Using a graduated cylinder adde 5mL of H2SO4 to the conical flask
- 3. Add some drops of potassium permanganate and heat to 55-60°C and complete the titration by adding permanganate solution until a faint pink color persists for 30sec.
- 4. Calculate the normality of permanganate ion.

$$N_{KMnO_4} * V_{KMnO_4} = N_{Na_2C_2O_4} * V_{Na_2C_2O_4}$$

{ $MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{+2} + 4H_2O$ } * 2 { $C_2O_4^- \rightarrow 2CO_2 + 2e^-$ } * 5

$$2 MnO_4^- + 16 H^+ + 5 C_2O_4^- \rightarrow 10 CO_2 + 2 Mn^{+2} + 8 H_2O$$