EXPERIMENT NO - 2

OBJECT :— To determine the chloride content [Cl^-] in the supplied water sample by Mohr's Method.

REQUIREMENT :— Burette, pipette, conical flask, measuring flask funnel, standard silver nitrate (N/50), distilled water.

INDICATORS :— Potassium chromate (K_2CrO_4) indicator.

PRINCIPLE :— This example is an example of precipitation titration. Mohr's method is used to determine chloride content in given sample. In this method a slightly alkaline solution solution is titrated against standard silver nitrate solution using potassium chromate as an indicator, as the titration proceeds, the chloride ions present in the sample react with $AgNO_3$ forming insoluble white precipitate of silver chloride the extra drop of $AgNO_3$ white precipitate reacts with Indicator forming a brick, red precipitate of silver chromate the change of colour from yellow to brick red marks the end point.

OBSERVATION :— (1) Concordant reading = 0.2 ml

(2) Concordant reading = 4.5 ml

Teacher's Signature _____

OBSERVATION :— (1) Reading with blank sample

(1)

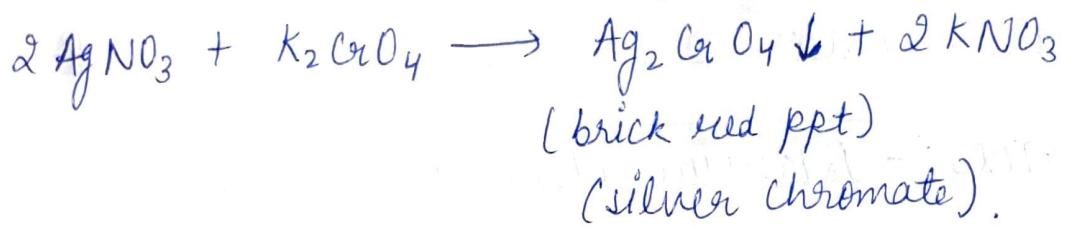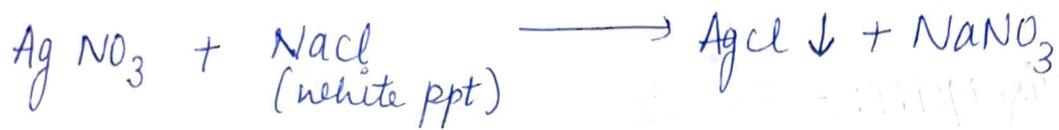| S.NO	Volume of distilled water in (ml)	Burette reading (ml)		Vol. of AgNO₃ used in (ml)
		initial	final	
1	10	0.0	0.2	0.2
2	10	0.2	0.4	0.2
3	10	0.4	0.6	0.2

Concordant reading $= V_A = \underline{0.2\ ml}$.

(2) Reading with sample solution.

S.NO	Vol. of Sample solution taken (ml)	Burette Reading		Vol. of AgNO₃ used in (ml)
		initial	final	
1	10	0	4.5	4.5
2	10	4.5	9	4.5
3	10	9	13.5	4.5

Concordant reading $= V_B = \underline{4.5\ ml}$

REACTION :-

$$Ag\,NO_3 \;+\; \underset{\text{(white ppt)}}{NaCl} \;\longrightarrow\; AgCl\downarrow \;+\; NaNO_3$$

$$2\,Ag\,NO_3 \;+\; K_2CrO_4 \;\longrightarrow\; Ag_2CrO_4\downarrow \;+\; 2\,KNO_3$$
$$\text{(brick red ppt)}$$
$$\text{(silver chromate)}.$$

CALCULATIONS :—

Volume of sample solution = 10ml.

Vol. of $AgNO_3$ used = $V_B - V_A$ = Vml = 4.5 - 0.2 = 4.3 ml

We know that, $N_1 V_1 = N_2 V_2$

$\underset{(AgNO_3)}{}$ Sample solution.

$$\frac{1}{50} \times 4.3 = N_2 \times 10$$

So, $N_2 = \dfrac{4.3}{500} = 0.0086$

The strength of chloride ions in g/L =
Normality × equivalent weight of Cl.

$\Rightarrow \quad \dfrac{4.3}{500} \times 35.5 \; gm/L = 0.3053 \; g/L$

$\Rightarrow \quad \dfrac{4.3 \times 35.5 \times 1000^{2}}{500} \; mg/L = 305.3 \; mg/L$

RESULT :— The chloride content in given water sample is 305.3 ppm

PROCEDURE :— Take 10 ml of distilled water in a conical flask and add atleast 5 drop of K_2CrO_4 indicator. slowly add standard solution of $AgNO_3$ from the burette and the volume of $AgNO_3$ is noted at the end point, ie. when yellow colour starts changing to red coloured precipitate. Repeat the titration for concordant reading. Now take 10ml

of the given water sample in a conical flask. Add five drops of freshly prepared K_2CrO_4 solution. Titrate against $AgNO_3$ till permands brick red colour is obtained. Repeat the titration till concordant reading is obtained.

PRECAUTIONS:—

(1) The apparatus should be washed with distilled water.

(2) The reaction mixture should be properly shaken during titration.

(3) Volume of Indicator should be same in all titration.