GARVIT SHAH
F-24

EXPERIMENT : No. 03

Page No.
Date

- Aim : To determine dissolved oxygen (DO) in waste water.

- Apparatus Required : Conical flask, Burette, test tubes

- Chemical Required : 0.005N $Na_2S_2O_3$ sol^n, alk. KI sol^n, $MnSO_4$ sol^n, starch sol^n as indicator.

- Reactions :

If no oxygen is present, a pure precipitate is formed when $MnSO_4$ and alkali-iodide reagent (NaOH + KI) are added to the sample

$$Mn^{2+} + 2OH^- \longrightarrow Mn(OH)_2 \text{ (white ppt)}$$

If sample has some oxygen, Mn^{2+} is oxidised to Mn^{4+} & precipitates brown hydrated oxide.

$$Mn^{2+} + 2OH^- + 0.5O_2 \rightarrow MnO_2 + H_2O$$

(Brown hydrated ppt)

MnO_2 oxidises iodide to iodine in the presence of acid : $MnO_2 + 2KI + H_2SO_4 \rightarrow Mn^{2+} + I_2 + K_2SO_4 + 2H_2O$

Iodine formed is titrated with thiosulfate sol^n

$$I_2 + 2Na_2S_2O_3 \longrightarrow Na_2S_4O_6 + 2NaI$$

Sundaram

Teacher's Sign. :

EXPERIMENT : No.

Page No.
Date

- **Procedure :**

1. Take 50mL of given water sample in a conical flask.
2. Add 2mL each of alkaline KI soln and $MnSO_4$ soln
3. Shake the flask vigorously. Brown ppt. will be produced.
4. Now add carefully 2mL of conc. H_2SO_4 soln and shake.
5. Brownish soln will be liberated, Iodine (I_2) will be produced.
6. Quickly add 2mL of freshly prepared starch solution (indicator) which gives blue colour.
7. Titrate ~~so~~ slowly against standard 0.005N $Na_2S_2O_3$ solutions till the blue color just disappears.
8. Repeat the titration 4 times.

- **Results :**

1. Volume of 0.005N $Na_2S_2O_3$ soln required for 50mL of given water sample = 12.0 mL
2. Dissolved oxygen in the given water sample = 9.6 mg/L

Sundaram

Teacher's Sign. : _____

Burette : 0.005 N $Na_2S_2O_3 \cdot 5H_2O$ sol^n

Flask : 50mL water sample + 2mL alkaline KI sol^n + 2mL of $MnSO_4$ sol^n + 2mL of conc. : H_2SO_4

Indicator : 2mL of starch sol^n

Color change : Blue to colourless

Observation Table :

Sr no.	Initial Burette Reading (mL)	Final Burette Reading (mL)	Differences (mL)
1	0	12.1	12.1
2	0	12.0	12.0
3	0	12.0	12.0

Calculation :

1000mL 1N $Na_2S_2O_3$ = 8g of dissolved oxygen

1mL 1N $Na_2S_2O_3$ = 8mg of dissolved oxygen

1mL 0.005N $Na_2S_2O_3$ = 0.04mg of dissolved oxygen

x mL 0.005N $Na_2S_2O_3$ = x × 0.04mg of dissolved oxygen

Sample taken :

$$(mg/L) = \frac{1000 \times BR \times 0.04}{50}$$

[∵ BR of $Na_2S_2O_3$ = I_2 liberated]