NAME - GARVIT VIJAYSHAM
ROLL NO: F-24 | BTech CSE

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- **Aim:** Estimation of Cu in brass sample using standard sodium thiosulfate solution (Iodometric titration)

- **Theory:**

1. $2CuSO_4 + 4KI \longrightarrow Cu_2I_2 + 2K_2SO_4 + I_2$
   $2Cu^{2+} + 2I^- \longrightarrow 2Cu^+ + I_2$

2. $I_2 + I^- \rightleftharpoons I_3^-$

3. Starch + I_3^- $\longrightarrow$ Starch - I_3 (Starch-triodide complex)
   (Colourless) (Dark blue)

4. $2S_2O_3^{2-} + I_2 \longrightarrow S_4O_6^{2-} + 2I^-$

- **Procedure:**

1. 0.5g of brass is dissolved in 10mL conc. HNO_3 & dilute it upto 100mL with distilled water in standard measuring flask.
2. Pipette 10mL of this diluted alloy solution (test sol^n) into a conical flask then add a few drops of dil. NH_4OH sol^n until a slight permanent ppt. remains
3. The ppt is redissolved by adding acetic acid drop by drop till the sol^n becomes clear.
4. Then about 5mL of a 5% KI sol^n is added & titrate the liberated iodine with 0.05N $Na_2S_2O_3$ solution from the burette using 1% starch sol^n

Sundaram

Teacher's Sign. :

Observation Table –

Sr No.	Initial Burette Reading (mL)	Final Burette Reading (mL)	Difference (mL)	Concurrent Reading mL
1	0.0	9.2	9.2	
2	0.0	8.2	8.2	8.2
3	0.0	8.2	8.2	
4	0.0	8.2	8.2	

Calculation –

1000mL IN $Na_2S_2O_3$ = 63.57g of Cu = 249.57g $CuSO_4 \cdot 5H_2O$

∴ 1mL IN $Na_2S_2O_3$ = 0.06357g of Cu = 0.24957g $CuSO_4 \cdot 5H_2O$

A mL of 0.05N $Na_2S_2O_3$ = 8.2mL

∴ Quantity of Cu in given solⁿ = $A \times 0.05 \times 0.06357 \times 100 / 10$

= B = 0.26g

% of Cu in the alloy = $X \times 100 / W$ = 52%.

B = quantity of Cu.

W = Weight of alloy taken = 0.5g

A = Constant Burette Reading

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as an indicator.

5. The end point is marked with the disappearance of blue colour.
6. Repeat the titration 3-4 times.

- **Observations :**

Burette - 0.05N $Na_2S_2O_3$ solution
Flask - 10mL dil. alloy sol^n + NH_4OH (dropwise till slight permanent ppt) + HAc (till ppt dissolves) + 5% KI.
Indicator - Starch sol^n (2-3 drop)
End pt - disappearance of blue colour

- **Equations :**

$$2CuSO_4 + 4KI \longrightarrow Cu_2I_2 + 2K_2SO_4 + I_2$$
$$I_2 + 2Na_2S_2O_3 \longrightarrow Na_2S_4O_6 + 2NaI$$
(Sodium Tetrathionate)

$2NaS_2O_3 = I_2 = 2CuSO_4 = 2Cu$
$NaS_2O_3 = I = CuSO_4 = Cu$

- **Results :**

1. 10mL of diluted sol^n required = 8.2mL of 0.05N $Na_2S_2O_3$
2. Quantity of Cu in the given sol^n = 0.26g
3. % of Cu in alloy = 52%

Sundaram

Teacher's Sign. : _____