

SHORT PROCEDURE :

Titration 2 : Standardization of Sodium thiosulphate

Burette solution : Sodium thiosulphate

Pipette solution : Potassium dichromate

Reagent added : 10 ml of dil. H_2SO_4 + 10 ml of 10% KI

Indicator : 1 ml Starch

End point : Disappearance of blue colour.

Standard Potassium Dichromate Vs Sodium Thiosulphate.

S.No	Volume of potassium dichromate (ml)	Burette Reading (ml)		Volume of Sodium Thiosulphate (ml)
		Initial	Final	
1.	20	0	19.5	19.5
2.	20	0	19.5	

Concordant value = 19.5 ml.

Calculation :

Volume of potassium dichromate

$$V_1 = 20 \text{ ml}$$

Strength of potassium dichromate

$$N_1 = 0.01 \text{ N}$$

Volume of sodium thiosulphate

$$V_2 = 19.5 \text{ ml}$$

Strength of sodium thiosulphate

$$N_2 =$$

According to the law of volumetric analysis $V_1 N_1 = V_2 N_2$

$$N_2 = \frac{V_1 N_1}{V_2}$$

$$= \frac{20 \times 0.01}{19.5}$$

Strength of sodium thiosulphate, $N_2 = 0.0103 \text{ N}$

ESTIMATION OF COPPER CONTENT OF THE GIVEN SOLUTION BY IODOMETRY

AIM :

To estimate the amount of copper present in the given solution by iodometric titration. A standard solution of $\text{Na}_2\text{S}_2\text{O}_3$ solution is provided.

PRINCIPLE :

Copper ion occurs naturally in drinking water and is a micronutrient required for the metabolism of living beings. But the presence of copper in water, in quantities more than 1.3 mg/lit will cause stomach ache, intestinal distress and digestive problems. High concentration of copper will also impart a metallic bitter taste to water.

Occurrence of copper ions in drinking water may be due to corrosion in plumbing materials and faulty water treatment processes. Copper is also known to cause toxicity to aquatic organism. Titrimetric estimation of copper is done through a redox reaction in which stoichiometric quantity of iodine is liberated on reaction with potassium iodide.

SHORT PROCEDURE :

Titration II : Estimation of copper content of the given solution.

Burette solution : Sodium thiosulphate.

Pipette solution : Given copper ion

Reagent added : 10 ml of dil. H_2SO_4 + 10 ml of 10% KI

Indicator : 1 ml Starch.

End point : Disappearance of blue colour.

Equivalent weight of copper : 63.5

Given Copper ion Vs Sodium thiosulphate

S.No	Volume of given copper ion (ml)	Burette Reading (ml)		Volume of Sodium Thiosulphate (ml)
		Initial	Final	
1	20	0	22	22
2	20	0	22	

Concordant value = 22 ml.

Calculation :

Volume of Sodium thio sulphate

$$V_1 = 22 \text{ ml}$$

Strength of Sodium thiosulphate

$$N_1 = 0.0103 \text{ N}$$

Volume of the given copper ion

$$V_2 = 20 \text{ ml}$$

Strength of the given copper ion

$$N_2 =$$

According to the law of volumetric analysis $V_1 N_1 = V_2 N_2$

$$N_2 = \frac{V_1 N_1}{V_2} = \frac{22 \times 0.0103}{20}$$

Strength of the given copper ion, $N_2 = 0.0113 \text{ N}$.

The liberated iodine can be titrated against standardized sodium thiosulphate solution.

When KI is added to the copper ion solution, copper ions react with KI liberates I_2 .



The liberated I_2 is titrated against sodium thiosulphate, using starch indicator.



Sodium tetrathionate



MATERIALS REQUIRED :

Potassium dichromate, Sodium thiosulphate, Potassium Iodide, Starch, Sulphuric acid, Ammonia, Acetic acid, Ammonium hydroxide.

Titration I

Standardization of sodium thiosulphate

20 ml of standard potassium dichromate solution is pipetted out into a clean conical flask. About 10 ml of dilute H_2SO_4 and 10 ml of 10% KI are added to it. The liberated iodine is immediately titrated against sodium thiosulphate solution taken in the burette. When the solution turns

Amount of copper ion present } = Equivalent weight of copper
in the given solution } strength of given copper ion

$$= 63.5 \times 0.0113$$

$$= 0.7175 \text{ g/l}$$

pale yellow, about 1 ml of freshly prepared starch is added and the titration is continued. The end point is the disappearance of blue colour is the end point. The titration is repeated for concordant values.

TITRATION II

Estimation of copper ion content of the given solution
20 ml of the given copper ion solution is pipetted out into a clean conical flask. About 10 ml of dil. H_2SO_4 and 10 ml of 10% KI solutions are added to this solution and the liberated iodine is titrated against standardized sodium thiosulphate taken in the burette. When the solution turns pale yellow, about 1 ml of freshly prepared starch indicator is added and the titration is continued. The disappearance of blue colour is the end point. The titration is repeated for concordant values.

RESULT :

Strength of the given copper ion solution = 0.0113 N

The amount of copper ion present in the given solution = 0.7175 g