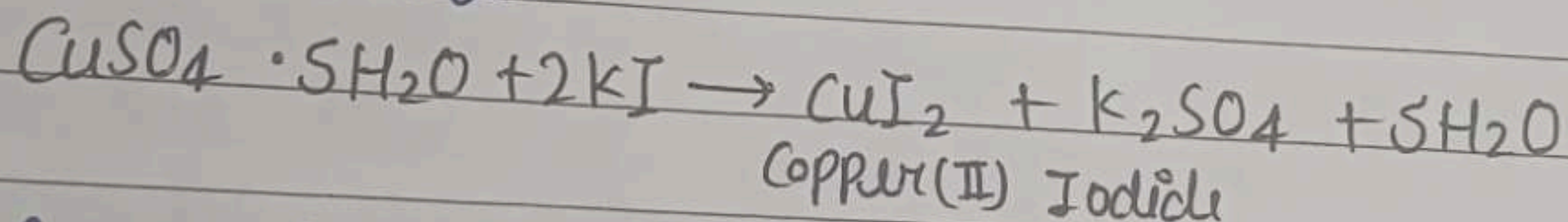


Experiment - 3.

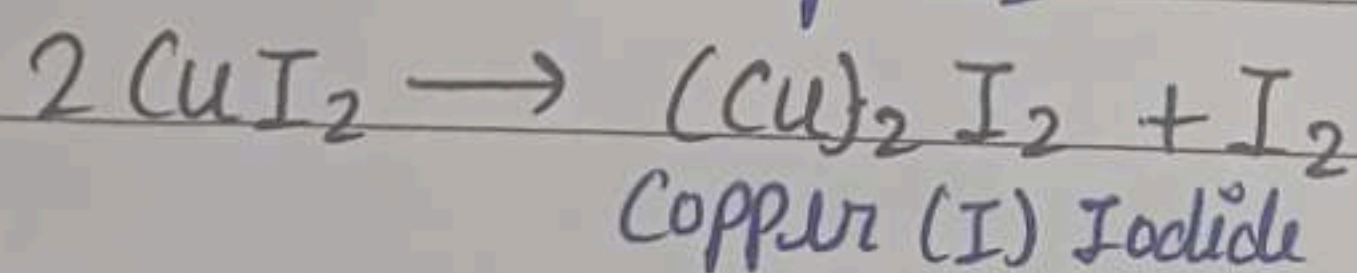
Aim - Determination of Cu^{++} ion content.

Objective - To determine the copper (Cu^{++}) ion content in the given sample of copper ore (blue vitriol) by titrating it against standard N/30 Sodium thiosulfate solution using KI and starch as indicator by iodometric titration.

Theory - The given solution of copper ore when mixed with KI solution in the presence of dilacetic acid. then a dark brown colour is obtained and following reaction occur:

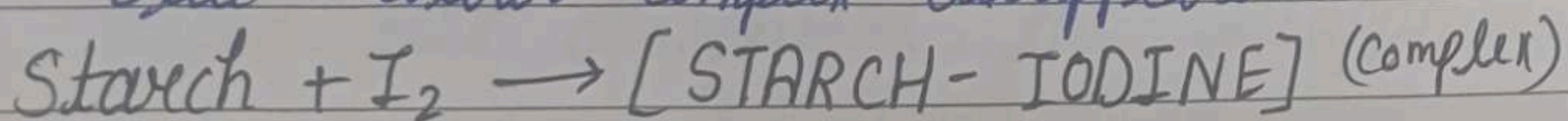


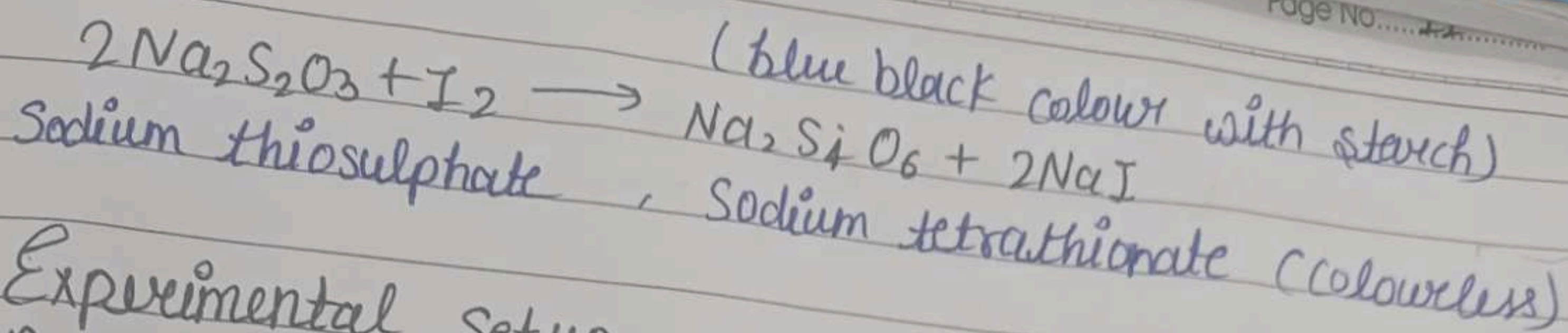
CuI_2 formed is unstable and reduces into cuprous iodide with the liberation of I_2 :



The liberated Iodine is titrating against standard N/30 Sodium thiosulfate till the colour of the solution becomes pale yellow.

Now 2-3 drops of freshly prepared solution of starch is added when the blue colour complex is formed and is further titrated with hypo solution till the blue colour complex disappears.





Experimental Setup.

- Apparatus:- Burette, pipette, conical flask, beaker
- Chemicals:- Copper Sulphate (CuSO_4) solution, standard N/30 Sodium thiosulphate solution ($\text{Na}_2\text{S}_2\text{O}_3$) KI, dilute acetic acid, and freshly prepared starch solution.

Indicator:- Freshly prepared starch solution.

Experimental procedure:-

1. fill the burette with standard Sodium thiosulphate solⁿ.
2. pipette out 10 ml of copper ore solution in the conical flask with the help of a pipette and add half test tube of acetic acid solution to make it acidic.
3. Now add 2ml of KI solution to it when a dark brown colour of the solution is obtained.
4. Titrate it with sodium thiosulphate solution slowly with constant stirring till pale yellow or light yellow colour appears, now add 2-3 drops of starch solution and stir the conical flask content when the solution changes to blue black colour.
5. Again titrate this blue coloured solution with N/30... hypo solution dropwise with constant stirring till the blue colour just disappears. the disappearance of

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- blue colour marks the completion of titration.
6. Note the reading of the burette
 7. Repeat the same process with the given sample solution of copper ore till two concordant readings are obtained and record your observation in obs table.

Observations.

S.No.	Volume of Copper Sol ⁿ taken in conical flask (10ml)	Burette Reading (ml)		Volume of N/30 $\text{Na}_2\text{S}_2\text{O}_3$ used ml
		initial	final	
1.	10 ml	0	9.3 ml	9.3 ml
2.	10 ml	0	9.5 ml	
3.	10 ml	0	9.3 ml	

Calculations:-

$$N_1 V_1 = N_2 V_2$$

$$N_1 = \frac{1/30 \times 9.3}{10} = \frac{9.3}{300} = 0.031 N$$

Strength Calculation:

$$\begin{aligned} \text{Strength} &= \text{Normality} \times \text{Equivalent weight} \\ &= 0.031 \times 63.5 \\ &= 1.9685 \text{ g/L} \end{aligned}$$

- Result:- The correct Cu^{++} ion content in the given sample of copper ore is 1.97 g/L

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Precautions:-

- **Cleaning:-** Glass apparatus should be properly cleaned before the start of experiment.
- **Acidification:-** Solution of copper ore should be made acidic by adding 2-3 ml of dilute acetic acid solution.
- **Titration:-** Do the titration drop wise and continuous shaking.

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