NEATH PORT TALBOT COLLEGE
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School of Maths & Science
Science Practical

Standardisation of a Solution of Sodium Thiosulfate

◆ **Aim**

At the end of the experiment you should be able to:
1. Standardise a solution of sodium thiosulfate to an acceptable degree of accuracy;
2. Explain why sodium thiosulfate cannot be used as a primary standard;
3. Explain the role of iodide ions in the reaction;
4. Give the equation for the reaction between iodide and iodate (V) ions in aqueous solution;
5. Give the half equation for sodium thiosulfate acting as a reducing agent;
6. Give the equation for the reaction between thiosulfate ions and iodine.

◆ **Introduction**

As sodium thiosulfate cannot be used as a primary standard a solution of approximate concentration is prepared and then standardised using for example, potassium iodate (V), KIO_3. Potassium iodate (V) cannot be titrated directly against sodium thiosulfate but it is used to liberate iodine from an aqueous solution of potassium iodide, KI. The liberated iodine is then titrated with the sodium thiosulfate. By using the relevant equations we can show that the molar ratio of IO_3^- to $S_2O_3^{2-}$ is 1:6.

◆ **Safety**

Control Measures
- The wearing of **safety glasses** and a **laboratory coat at all times** will be sufficient to take account of most hazards and significant risks.
- All waste is washed to waste with large volume of water.
- You are reminded of the need of good laboratory practice in order to maintain a safe working environment.

Hazards

Corrosive	Dilute sulfuric acid
Oxidising	Potassium iodate

◆ Procedure

1. Weigh out accurately about 0.9 g of potassium iodate (V) and make up to 250 cm^3 of solution.

2. Pipette 25 cm^3 of this solution into a conical flask, add 1 g of potassium iodide and 15 cm^3 of dilute sulfuric acid.
    Titrate the liberated iodine with the thiosulfate solution, adding 2 cm^3 of starch solution when the solution is pale yellow.
    Continue the titration adding the sodium thiosulfate solution from the burette one drop at a time until the blue colour disappears.

3. Repeat to obtain three consistent titres.

◆ Questions

1. Write equations for the reaction between iodate (V) ions and iodide ions, and thiosulfate ions and iodine.

2. Show that the molar ratio of IO_3^- to $S_2O_3^{2-}$ is 1:6.

3. Use your results calculate the exact concentration of sodium thiosulfate solution.

4. What is a primary standard?

5. Why is sodium thiosulfate unsuitable as a primary standard?