**5.3 IODINE-THIOSULPHATE TITRATIONS**

1. The active ingredient in bleach is sodium chlorate (I). It can be reduced by iodide ions to make iodine:

ClO- + 2H+ + 2I- 🡪 Cl- + I2 + H2O

In an experiment to determine the co

ncentration of sodium chlorate (I) in a bleach, 5 cm3 of the bleach was pipetted into a volumetric flask and made up to 250 cm3.

25 cm3 portions of this solution were then added to a conical flask and an excess of potassium iodide was then added. The resulting solution was titrated against 0.1 moldm-3 sodium thiosulphate, and 22.3 cm3 was required.

1. Write an equation for the reaction between sodium thiosulphate and iodine
2. Hence determine the concentration of sodium chlorate (I) in the original bleach sample
3. In an experiment to determine the percentage by mass of copper in a 1 pence coin weighing 1.24 g, the coin was completely dissolved in concentrated nitric acid until all of the copper had been oxidised to copper (II) ions. The excess nitric acid was then neutralised and the volume made up to 250 cm3 in a volumetric flask.

25 cm3 portions of this solution were then added to a conical flask and an excess of potassium iodide was then added. Cu ions react with iodide ions as follows:

2Cu2+ + 4I- 🡪 2CuI + I2

The resulting solution was titrated against 0.1 moldm-3 sodium thiosulphate, and 18.4 cm3 was required.

Determine the percentage of copper in the coin.

1. Potassium iodate (V), KIO3, reacts with iodide ions to produce iodine as follows:

IO3- + 6H+ + 5I- 🡪 3I2 + 3H2O

O.75 g of an impure sample of KIO3 was dissolved in water and made up to 250 cm3 in a volumetric flask.

25 cm3 portions of this solution were then added to a conical flask and an excess of potassium iodide and dilute sulphuric acid were then added. The resulting solution was titrated against 0.1 moldm-3 sodium thiosulphate, and 17.1 cm3 was required.

Determine the percentage purity of the sample of potassium iodate (v).