CHEMISTRY

Lab 17: Investigation of the rate of the reaction between sodium thiosulphate and hydrochloric acid

Preparation of solutions

Using a volumetric cylinder, the 1.0 M HCl solution and distilled water, prepare five solutions of HCl of different concentrations and a volume of 10.0 cm^3:

1. Prepare the first solution with 8.0cm^3 of HCl and 2.0 cm^3 of distilled water
2. Prepare the first solution with 6.0cm^3 of HCl and 4.0 cm^3 of distilled water
3. Prepare the first solution with 4.0cm^3 of HCl and 6.0 cm^3 of distilled water
4. Prepare the first solution with 2.0cm^3 of HCl and 8.0 cm^3 of distilled water

Measuring the reaction rate

1. Pour 10.0 cm^3 of sodium thiosulphate $Na_2S_2O_3$ solution 0.25 M in a small beaker and place the beaker over a piece of paper marked with a cross.
2. Measure 10.0 cm^3 of HCl solution 1.0 M with a volumetric cylinder.
3. Drop quickly the HCl solution in the sodium thiosulphate solution and start the stopwatch.
4. Using the thermometer, stir the mixture continuously.
5. Record the time Δt required for the mixture to become turbid enough so that the cross disappears.
6. Record the temperature of the mixture.
7. Repeat steps 1 to 6 for the four solutions you have prepared.

Processing

1. Calculate the initial concentration of the four HCl solutions
2. Calculate the initial concentrations of HCl in the four mixtures with sodium thiosulphate.
3. Calculate the reciprocal of time ($1/\Delta t$) required for the cross to dissapear.
4. Plot $1/\Delta t$ versus [HCl] (in the mixture), calculate the slope, and comment on the graph
5. (HL only) Comment on the order of the reaction.