

## The effect of temperature on reaction rate

### Introduction

Sodium thiosulfate solution is reacted with acid, a precipitate of sulfur forms. The time taken for a certain amount of sulfur to form is used to indicate the rate of the reaction. The effect of temperature on the rate of reaction can be investigated.

### Equipment

#### Apparatus

- Eye protection.
- Conical flask, 250 cm<sup>3</sup>
- Measuring cylinder, 10 cm<sup>3</sup>
- Measuring cylinder, 50 cm<sup>3</sup>

#### Chemicals

- Sodium thiosulfate solution 40 g dm<sup>-3</sup>
- Hydrochloric acid 2 mol dm<sup>-3</sup>

#### Health, safety and technical notes

- Read our standard health and safety guidance here <https://rsc.li/3ilGNVl>
- Always wear eye protection.
- Ensure good ventilation, use fume cupboard if necessary.
- Sulfur dioxide is formed as a by-product, see CLEAPSS Hazcard [HC097](#).
- For more information on sodium thiosulfate, see CLEAPSS Hazcards [HC095a](#).
- Hydrochloric acid is an irritant, see CLEAPSS Hazcard [HC047a](#).

#### Notes

The method for this experiment is best understood when the teacher demonstrates it first. The endpoint can be measured with a light sensor connected to a data-logger. A light sensor set up as a colorimeter can be used to monitor the precipitation on a computer – clamp a light sensor against a plastic cuvette filled with the reactants.

The result, in the form of graphs on the computer, provides very useful material for analysis using data logging software.

The software shows the change on a graph, and this tends to yield more detail than the end-point approach used in this experiment.

The rate of change can be measured from the graph slope, or the time taken for a change to occur.

As soon as the reaction is complete, pour the solutions away, preferably into the fume cupboard sink. Wash away with plenty of water. This is particularly important with solutions used at higher temperatures.