

The Briggs-Rauscher oscillating reaction

Education in Chemistry

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Technician notes

Kit

- 20 cm³ of 10 vol hydrogen peroxide solution
- 1.2 g potassium iodate(V) (oxidising, irritating, harmful if swallowed)
- 20 cm³ of sulfuric acid (0.1 M)
- 0.4 g of malonic (propanedioic) acid (irritating, harmful if swallowed)
- 0.09 g manganese sulfate(VI) monohydrate (may cause damage to organs through repeated/prolonged exposure, toxic to aquatic life)
- magnetic stirrer and follower
- 100 cm³ conical flask or beaker
- 1 cm³ of fresh 1% starch solution

Preparation

Wear eye protection and avoid raising dust when weighing out the solids. Label the hydrogen peroxide solution 'A'. Dissolve 1.2 g potassium iodate(V) in 20 cm³ of sulfuric(VI) acid (0.1 M) and label this solution 'B'. Label the starch solution 'C'. Dissolve 0.4 g malonic acid and 0.09 g manganese sulfate(VI) monohydrate in 20 cm³ of deionised water – label this solution 'D'.

In front of the class

Add the solutions to a beaker or conical flask placed on a magnetic stirrer in alphabetical order. After a short induction period, the colourless solution will turn orange, then black, and return to colourless before repeating for approximately five minutes – finally settling in the black form.

Disposal and safety

At the end of the demonstration there will be some solid iodine at the base of the vessel that can be reduced with sodium thiosulfate before the solution is poured down the sink with plenty of water.

CLEAPSS members should consult CLEAPSS recipe card 63 (oscillating reactions). Wear eye protection when performing the experiment – the diluted solutions, once prepared for use in the reaction, require no hazard warning.