The chemistry of thiosulfate ions

In this experiment you will be looking at some interesting chemical reactions of sodium thiosulfate. You will probably already be aware of the reaction between sodium thiosulfate and iodine.

Part A

The reaction between thiosulfate ions and iodine solution

Instructions

1. Cover the worksheets with a clear plastic sheet.
2. Put one drop of iodine solution in the box below.
3. Add two drops of thiosulfate solution.

	Solution of aqueous iodine
Solution of thiosulfate ions	

Observe, comment and write an equation for the reaction.

Question

1. What type of reaction are you observing?

Part B

The reaction between thiosulfate and silver halide

Instructions

1. To form the silver halides, first put one drop of silver nitrate solution into each of the empty boxes below, then add one drop of potassium bromide solution and potassium iodide solutions into the appropriate boxes. Observe and comment.

2. Add three drops of sodium thiosulfate solution to each box and stir with the end of a pipette. Observe and comment.

	1. Potassium bromide solution	1. Potassium iodide solution
Silver nitrate solution		
	2. Sodium thiosulfate solution	2. Sodium thiosulfate solution

Question

1. What explanations can you give for your observations?

Part C

The reaction between thiosulfate ions and transition metal ions

Instructions

1. Put two drops of iron(III) solution in the first box.
2. Put two drops of iron(III) solution and one drop of copper(II) solution in the second box.
3. Put two drops of copper(II) solution in the third box.
4. Add one drop of thiosulfate solution to each box and observe carefully, especially the second box.

Solution of	Iron(III)ions	Iron(III) + Copper(II) ions	Copper(II) ions
Thiosulfate ions			

Question

1. What explanations can you give for your observations?

Health & Safety

Wear eye protection for part B and splash resistant goggles to BS EN166 3 for part C.

Silver nitrate, 0.1 mol dm^{-3}, AgNO3 (aq) is an eye irritant. Keep separate from organic waste containers.

Copper(II) sulfate 0.2 mol dm^{-3} causes eye damage and is toxic to aquatic life.

Iron(III) nitrate, 0.1 mol dm^{-3}, $Fe(NO_3)_3.9H_2O$ (aq), Potassium bromide, 0.2 mol dm^{-3}, KBr (aq) and Potassium iodide, 0.2 mol dm^{-3}, KI(aq) are low hazard. As is Iodine solution 0.05 mol dm^{-3} but this is also toxic to aquatic life.

Credits

Health & safety checked May 2018

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