

Some reactions of sulfur dioxide

Topic

Gases.

Timing

20 min.

Apparatus (per group)

- Student information sheet and worksheet
- One clear plastic sheet (eg ohp sheet)
- One 9 cm plastic petri dish (base + lid)
- One plastic pipette
- Scissors.

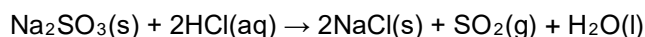
Chemicals (per group)

Solutions contained in plastic pipettes, see 'Apparatus and techniques for microscale chemistry' handout.

- Hydrochloric acid 1 mol m⁻³
- Potassium iodide 0.2 mol dm⁻³
- Potassium iodate(V) 0.1 mol dm⁻³
- Potassium manganate(VII) 0.01 mol dm⁻³
- Full-range indicator solution diluted 1:1 with deionised water
- Sulfuric acid 1 mol dm⁻³
- Sodium sulfite powder

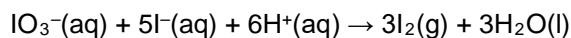
Method

Sodium sulfite + hydrochloric acid generates sulfur dioxide:

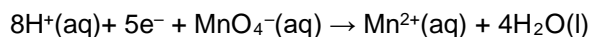


Results

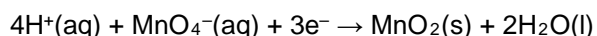
The iodide/iodate mixture turns black due to liberation of iodine:



If sufficient sulfur dioxide is produced and the solution contains excess acid, the potassium manganate(VII) solution is decolorised:



However, with less sulfur dioxide and therefore less acid, the brown manganese(IV) oxide is formed:



Full-range indicator turns from green to yellow indicating that sulfur dioxide is an acidic gas.



Health & Safety

Students must wear eye protection.

Sulfur dioxide is toxic and is a particular problem for asthmatics. Only use a very small amount of sulfite and acid to keep the sulfur dioxide production to a minimum. A risk-assessment should include any individual sensitivities.

Hydrochloric acid 1 mol dm^{-3} , Potassium iodide 0.2 mol dm^{-3} , Potassium iodate(V) 0.1 mol dm^{-3} and Potassium manganate(VII) 0.01 mol dm^{-3} are all of low hazard.

Sulfuric acid 1 mol dm^{-3} is a skin/eye irritant.

Sodium sulfite powder. Is a skin, eye and respiratory irritant.

Depending on its formulation full range indicator can still be flammable when diluted 1:1 with water. Keep away from sources of ignition.

Credits

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Health & safety checked May 2018

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