

# Electrolysis using a microscale Hoffman apparatus – teacher notes

In this experiment students use a microscale Hoffman apparatus to investigate the electrolysis of sodium sulphate solution.

## Topic

Electrolysis

## Timing

25 minutes

## Equipment

### Apparatus

- Eye protection
- Clamp and stand
- Microscale Hoffman apparatus (see note 3 below)
- 9 volt battery and leads with crocodile clips
- Plastic pipette
- Blu-Tack®
- Beaker, 100 cm<sup>3</sup>

### Chemicals

- Sodium sulfate solution, 0.2 mol dm<sup>-3</sup>
- Bromothymol blue indicator

### Health, safety and technical notes

1. Read our standard health and safety guidance (<https://rsc.li/3xQfR9o>).
2. Wear eye protection throughout.
3. Check our guidance on apparatus and techniques for microscale chemistry (<https://rsc.li/3b8emd3>) to find out more about setting up microscale Hoffman apparatus.
4. Sodium sulfate, Na<sub>2</sub>SO<sub>3</sub>(aq), 0.5 mol dm<sup>-3</sup> is of low hazard. See CLEAPSS Hazcard HC098B and CLEAPSS Recipe Book RB107.
5. Bromothymol blue solution is of low hazard. See CLEAPSS Hazcard HC032.

### Teaching notes and expected observations

Streams of bubbles are seen at each electrode. The colour of the solution around the cathode gradually turns blue due to the formation of sodium hydroxide. The solution around the anode becomes greenish-yellow.

If the tops of the pipettes are sealed with Blu-Tack® the volume of gas collecting above the cathode (hydrogen) is seen to be greater than that collecting above the anode (oxygen). If left connected for long enough the ratio of the volumes corresponds to the 2:1 ratio of hydrogen to oxygen in water. The shortened pipette (see our guidance on microscale apparatus and techniques – <https://rsc.li/3b8emd3>) can be used to sample the hydrogen gas and to test it by blowing it into a flame (it ‘pops’).