Electrolysis using a microscale Hoffman apparatus

Topic

Electrolysis.

Timing

25 min.

Description

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

Apparatus (per group)

- Clamp and stand
- Microscale Hoffman apparatus (see 'Apparatus and techniques for microscale chemistry' handout.)
- One 9 volt battery and leads with crocodile clips
- Plastic pipette
- Blu-Tack®
- One 100 cm^3 beaker.

Chemicals (per group)

- Sodium sulphate solution 0.2 mol dm^{-3}
- Bromothymol blue indicator.

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:oxygen in water. The shortened pipette ('Apparatus and techniques for microscale chemistry' handout) can be used to sample the hydrogen gas and to test it by blowing it into a flame (it 'pops').

Health & Safety

Sodium sulphate, 0.5 mol dm^{-3} Na_2SO_3 (aq) and bromothymol blue solutions are of low hazard.

Credits

Health & safety checked May 2018

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