

**EXPERIMENT: ELECTROLYSIS
OF WATER**

Syllabus reference 8.2.4

INTRODUCTION

Water is an important compound in nature. It is a molecule composed of two atoms of hydrogen and one atom of oxygen held together by covalent bonds. Water can be separated into its constituent elements by electrolysis.

AIM

To observe the electrolysis and test the products of the process.

EQUIPMENT

- retort stand and 2 clamps
- DC power source (0–12 V)
- 2 electrical leads with alligator clips
- 2 stainless steel electrodes with insulation (at least 30 cm long) from which the last 7 cm of insulation has been removed
- 500 mL beaker
- 2 test tubes and stoppers
- matches and taper
- splint of wood
- stirring rod
- 10 mL 1 mol/L sulphuric acid

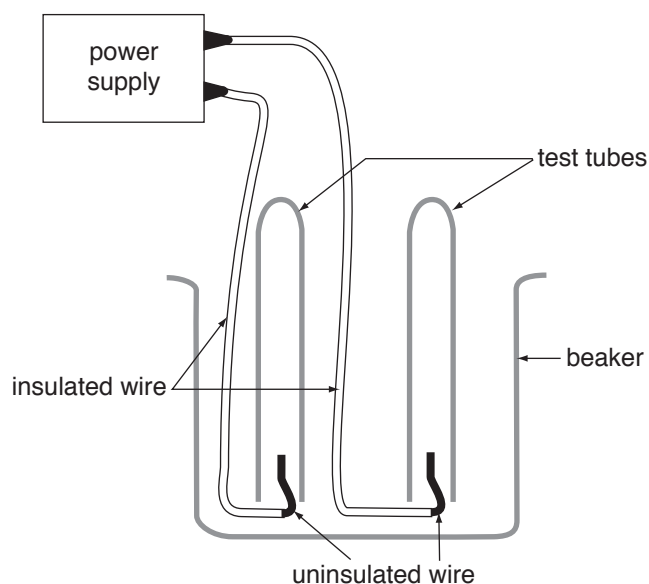


SAFETY: Wear safety glasses and protective clothing. Make sure power source is turned off when connecting and disconnecting electrodes.

Sulphuric acid is corrosive so avoid contact with skin. If contact occurs wash thoroughly with water.

PROCEDURE

- 1 Fill the beaker with about 400 mL of tap water and add 10 mL of 1 mol/L sulphuric acid. Stir to ensure the acid is thoroughly mixed.
- 2 Completely fill the test tubes with the solution from the beaker.
- 3 Bend the stainless steel wire as shown in the diagram and put each stripped end in each of the test tubes.
- 4 Place your finger over one of the test tubes and carefully invert it in the beaker as shown in the diagram. Ensure no air enters the test tube. Clamp in place.



- 5 Connect the wires to the electrical clips which are connected to the power supply.
- 6 Set the power supply to 6–8 V and switch on the power. You may need to adjust the power output. Electrolyse for about 30 minutes.
- 7 Switch off the power. Remove the electrodes, examining them and noting any change.
- 8 Observe and record any changes. Note the relative amount of gas produced at each electrode. Identify which test tube contains hydrogen and which contains oxygen.
- 9 Carefully remove each of the electrodes and stopper each of the test tubes while still underwater.
- 10 Test for hydrogen by quickly removing the stopper and placing a lighted taper to the end of the test tube. Record your observations.
- 11 Test for oxygen by placing a glowing splinter of wood in the test tube. Record your observations.

RESULTS

QUESTIONS

1 Write a balanced equation for the reaction.

2 Explain the relative amounts of hydrogen and oxygen formed.

3 Suggest an everyday application of the use of this reaction.
