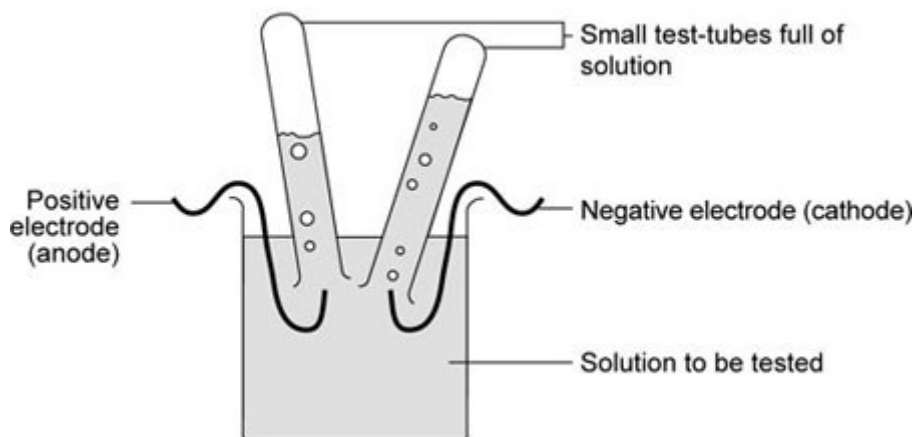


## The electrolysis of solutions – student sheet

### Introduction

When electricity passes through molten compounds, like sodium chloride, the ions move towards the electrode of opposite charge. Sodium chloride gives sodium metal and chlorine gas. This experiment illustrates what happens when the system is made more complicated because water is present. Electricity is passed through various solutions and the products are identified.



### Equipment

#### Apparatus

- Eye protection
- Beaker, 100 cm<sup>3</sup>
- Electrodes (S-shaped are preferable)
- Small test tubes for gas collection
- Two leads
- Two crocodile clips
- DC power supply (6 V is reasonable)

#### Chemicals

- Universal indicator paper

Access to solutions of :

- Sodium chloride 0.5 mol dm<sup>-3</sup>
- Copper chloride 0.5 mol dm<sup>-3</sup>
- Potassium iodide 0.5 mol dm<sup>-3</sup>
- Sodium bromide 0.5 mol dm<sup>-3</sup>
- Potassium sulfate 0.5 mol dm<sup>-3</sup>
- Copper(II) sulfate 0.5 mol dm<sup>-3</sup>
- Silver nitrate 0.1 mol dm<sup>-3</sup>

#### Health, safety and technical notes

- Read our standard health and safety guidance here <https://rsc.li/3VVLha5>
- Always wear eye protection.
- Chlorine is toxic and harmful to the lungs, eyes and respiratory tract. See CLEAPSS Hazcard HC022a.
- Bromine vapour is an irritant and very toxic if inhaled. See CLEAPSS Hazcard HC015b.

- Iodine is harmful by skin contact. See CLEAPSS Hazcard HC045.
- Hydrogen is extremely flammable. See CLEAPSS Hazcard HC048.
- Oxygen supports combustion. See CLEAPSS Hazcard HC069.
- Ensure good ventilation.
- Do not allow chlorine or bromine vapour to be produced for very long.

### Procedure

1. Set up the apparatus as shown.
2. Switch on and observe what happens.
3. Try to identify the gases produced (if any).

### Questions

1. What type of element is formed at the negative electrode?
2. What type of element is formed at the positive electrode?
3. Your table of results should show some products, which could not come from the compound itself that was electrolysed. Where could these other products have come from?
4. Write a general rule for the products formed at (a) the cathode and (b) the anode.