GCSE Chemistry required practical activity 3: Electrolysis

Student sheet

Required practical activity	Apparatus and techniques
Investigate what happens when aqueous solutions are electrolysed using inert electrodes. This should be an investigation involving developing a hypothesis	AT 3, AT 7 AT 8 (Chemistry only)

Investigating the elements formed at each electrode when different salt solutions are electrolysed.

In this investigation you will use a low voltage power supply and carbon rod electrodes to pass a current through four different salt solutions. You will identify the element formed at the positive and negative electrode in each case.

Learning outcomes
1 **2** **Teachers to add these with particular reference to working scientifically**

Method

You are provided with the following:

- Copper(II) chloride solution
- Copper(II) sulfate solution
- Sodium chloride solution
- Sodium sulfate solution
- 100cm^3 beaker with petri dish lid
- Two carbon rod electrodes
- Two crocodile / 4mm plug leads
- Low voltage power supply
- Blue litmus paper
- Tweezers

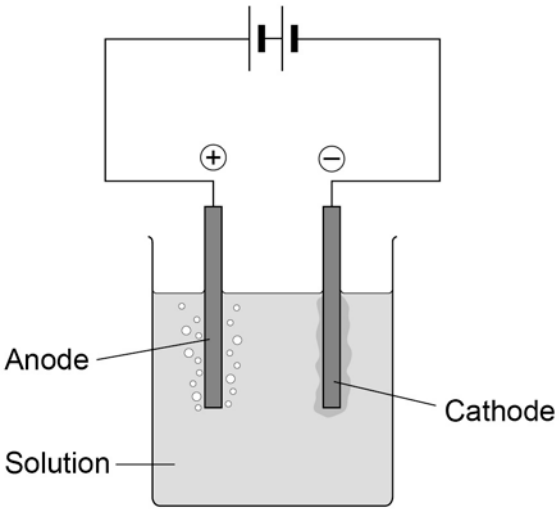
Risk assessment

Safety goggles must be worn throughout.

You should read these instructions carefully before you start work.

1. Pour copper (II) chloride solution into the beaker to about 50cm^3.
2. Add the lid and insert carbon rods through the holes. **The rods must not touch each other.**

   Attach crocodile leads to the rods. Connect the rods to the **dc (red and black)** terminals of a low voltage power supply.



3. Select 4v on the power supply and switch on.
4. Look at both electrodes. Is there bubbling at neither, one or both electrodes?
5. Using tweezers hold a piece of blue litmus paper in the solution next to the positive electrode (the one connected to the red terminal). You will need to lift the lid temporarily to do this. Write your observations in the first blank row of the table below. What is this element?
6. After no more than five minutes, switch off and examine the negative electrode (the one connected to the black terminal). Is there evidence of a metal coating on it? What could it be? Record your results in the table.
7. Clean out the equipment carefully and repeat the investigation with solutions of copper (II) sulfate, sodium chloride and sodium sulfate.

Additional information:

If a gas is produced at the positive electrode which does **not** bleach blue litmus paper, it is oxygen. The amounts produced are usually too small to identify by testing.

If a gas is produced at the negative electrode, it is hydrogen. The amounts produced are usually too small to identify by testing.

solution	Positive electrode (anode)		Negative electrode (cathode)	
	Observations	Element formed	Observations	Element formed
copper (II) chloride				
copper (II) sulfate				
sodium chloride				
sodium sulfate				