

WJEC (Wales) Chemistry GCSE

Specified Practical 2.3b

Investigation into electrolysis of aqueous solutions
and electroplating

[Methods are adapted from the [Royal Society of Chemistry](#) and from the
[WJEC SP 2.3b Practical Specification](#)]

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Electrolysis

Aim

To investigate the **products** of the **electrolysis** of aqueous solutions and **electroplating**.

Equipment list

- 0.5 M copper(II) sulfate solution
- 250 cm³ beaker
- A petri dish lid with bored holes
- Two carbon rod electrodes with support bungs
- Leads and crocodile clips
- Low voltage power supply (12V)

Method

1. Add approximately 50 cm³ of **copper(II) sulfate** solution to a beaker.
2. Add the **lid** and insert the **electrodes** through the holes, making sure the electrodes don't touch.
3. Attach the crocodile clips and leads to the electrodes and connect the leads to the DC terminals of the **power supply**.
4. Set the power supply to **4V** and switch the power supply on.
5. After a few minutes turn the power supply off and observe the negative electrode.
6. Record **observations** at each of the electrodes.

Results

A deposit of **copper** will form on the **cathode** and will often be powdery and uneven. A much lower current is used in the process of electroplating as this will cause the copper coating to be shinier and more difficult to rub off.

Bubbles of gas (oxygen) are produced at the **anode**.

Cathode reaction: $\text{Cu}^{2+}(\text{aq}) + 2\text{e}^{-} \rightarrow \text{Cu}(\text{s})$

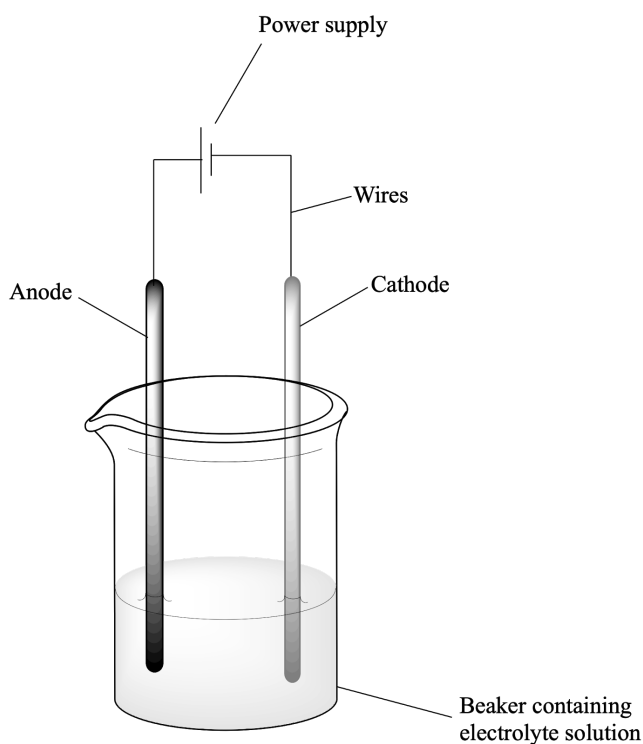
Anode reaction: $2\text{H}_2\text{O}(\text{l}) \rightarrow \text{O}_2(\text{g}) + 4\text{H}^{+}(\text{aq}) + 4\text{e}^{-}$

Electroplating Vs Electrolysis

- **Electrolysis** is a process which uses a direct electrical current to **break up** ionic compounds.
- **Electroplating** is a process that uses electrical current to reduce dissolved metal cations so that they **form a coherent metal coating** on an electrode.



Diagram



Safety precautions

- **Copper(II) sulfate** is an **irritant**. Safety goggles must be worn at all times and any spilled solution must be cleaned up immediately. Wash the skin if any comes into contact with the solution.
- Take care when using **electrical equipment** around liquids. Make sure the power supply is set up to the correct voltage before turning on.

