

AQA Chemistry A-level

Required Practical 8

Measuring the EMF of an electrochemical cell

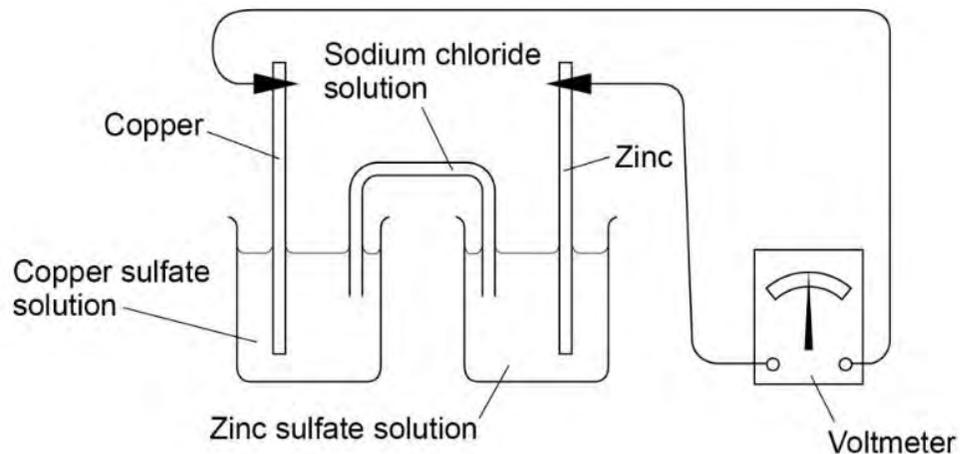


Setting up an electrochemical cell: zinc and copper

| Method | Accuracy | Explanation |
|--|---|---|
| 1. Clean a piece of copper and a piece of zinc using emery paper or fine grade sandpaper. | <ul style="list-style-type: none"> Removes the oxide layer on the metal. | |
| 2. Degrease the metal pieces using some cotton wool and propanone. | | Grease could prevent the cell working as efficiently. |
| 3. Place the copper into a 100 cm ³ beaker with about 50 cm ³ of 1.0 mol dm ⁻³ CuSO ₄ solution. | | This is a half-cell. |
| 4. Place the zinc into a 100 cm ³ beaker with about 50 cm ³ of 1.0 mol dm ⁻³ ZnSO ₄ solution. | | This is a half-cell. |
| 5. Lightly plug one end of a plastic U-tube with cotton wool and fill the tube with the solution of 2.0 mol dm ⁻³ sodium chloride solution (NaCl), then plug other end. | | |
| 6. Join the two beakers with U-tube so that the plugged ends are in the separate beakers. | <ul style="list-style-type: none"> Ensure the ends are fully submerged in the solutions. | |
| 7. Connect the Cu _(s) Cu ²⁺ _(aq) and Zn _(s) Zn ²⁺ _(aq) half-cells by connecting the metals using crocodile clips and leads. Include a voltmeter in the circuit in order to read off the voltage. | | Allows the cell EMF to be found. |

Diagram:





Salt bridges:

- Allow the movement of ions between electrodes and to complete the circuit.
- Must not react (inert) with the electrolyte or ions in solution and must conduct electricity.
- Platinum is often used.
- Alternatively, a strip of filter paper saturated with NaCl solution can be used instead of a U-tube.

Comparing electrode potentials of different metals:



| Method | Accuracy | Explanation |
|--|---|---|
| 1. Clean a piece of copper using emery paper or fine grade sandpaper. | <ul style="list-style-type: none"> Removes the oxide layer on the metal. | |
| 2. Connect to the positive terminal of a voltmeter using a crocodile clip and one of the leads. | | |
| 3. Cut a piece of filter paper to about the same area as the copper and moisten with sodium chloride solution. Place it on top of the metal. | | |
| 4. Connect a second lead to the voltmeter and use the crocodile clip to connect the lead to a piece of a different metal. | | |
| 5. Hold the metal against the filter paper. Record the voltage reading, including the sign. | | Cell potential can be positive or negative. |
| 6. Repeat with different metals and compare the electrode potentials. | | |

Diagram:

