

# OCR (B) Chemistry A-Level

## PAG 08 - Electrochemical cells

### **(A level only)**

Flashcards

This work by [PMT Education](https://www.pmt.education) is licensed under [CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)



# What must a half cell contain?



What must a half cell contain?

An element in 2 oxidation states



Define the terms oxidation and reduction



Define the terms oxidation and reduction

Oxidation - loss of electrons

Reduction - gain of electrons



Why must metal electrodes be cleaned with sandpaper before creating an electrochemical cell?



Why must metal electrodes be cleaned with sandpaper before creating an electrochemical cell?

To remove any metal oxide that has formed on the surface and improve electrical conductivity.



Describe the movement of electrons in  
an electrochemical cell





Describe the movement of electrons in an electrochemical cell

Electrons flow through the wire from the positive electrode to the negative electrode.



In an standard  $\text{Zn}/\text{Zn}^{2+}$  cell, what is the role of potassium nitrate solution?



In an standard  $\text{Zn}/\text{Zn}^{2+}$  cell, what is the role of potassium nitrate solution?

Potassium nitrate is used to saturate a piece of filter paper so that it can be used as a salt bridge



Why is a salt bridge used in an electrochemical cell?



# Why is a salt bridge used in an electrochemical cell?

To maintain the charge balance and complete the circuit.

This is because negative electrons are moving from one half cell to another. Without the salt bridge, positive charge would build up in the half cell containing the anode and negative charge would build up in the half cell containing the cathode. This would cause the reaction to stop.



Why must an inert salt be used in the salt bridge?



Why must an inert salt be used in the salt bridge?

So that the salt doesn't react with the solutions and alter their concentrations. If a reactive salt was used, the cell potential would change.



# What moves across the salt bridge?





# What moves across the salt bridge?

Ions



In an electrochemical cell, each metal electrode is placed in a solution containing what?



In an electrochemical cell, each metal electrode is placed in a solution containing what?

Its ions

E.g. solid copper is placed in a solution of copper(II) sulfate



Standard conditions are often used when investigating electrochemical cells. What are the standard conditions?



Standard conditions are often used when investigating electrochemical cells. What are the standard conditions?

1 mol dm<sup>-3</sup> solutions

298 K

1 atm



After setting up an electrochemical cell, the reading on the voltmeter is negative. What should be done?



After setting up an electrochemical cell, the reading on the voltmeter is negative. What should be done?

Switch the connection of the wires so the electrodes are the right way round



What is the formula for the electromotive force (EMF)?





What is the formula for the electromotive force (EMF)?

$$\text{EMF} = E_{\text{R}} - E_{\text{L}}$$

where  $E_{\text{R}}$  - right hand cell, where the reduction occurs, and  $E_{\text{L}}$  - left hand cell, where oxidation occurs.



For a reaction to be thermodynamically feasible, what must the value of the EMF be?



For a reaction to be thermodynamically feasible, what must the value of the EMF be?

Positive

