

Edexcel Chemistry A-Level Core Practical 10 - Electrochemical cells

Flashcards

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What is an electrochemical cell?







What is an electrochemical cell?

- Two different half cells are connected by a salt bridge, with their electrodes connected to a voltmeter (measures EMF/cell potential). This allows the flow of electrons.
- The electrical energy generated is from the chemical redox reactions.







What does an electrochemical cell look like as a diagram?







What does an electrochemical cell look like as a diagram? Voltmeter Graphite electrode Copper electrode salt bridge Copper (II) solution Solution contaning Iron (II) and Iron (III)

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What does a half cell consist of?







What does a half cell consist of?

- A half cell contains the chemical species present in a redox half equation.
- Half cells are usually metal / metal ion (metal electrode in the metal ion solution) or ion / ion (ions of the same element but different oxidation states, in solution).







What is a salt bridge?







What is a salt bridge?

- A salt bridge allows the transfer of ions.
- It is typically a strip of filter paper soaked
 - in a concentrated solution of an electrolyte
 - i.e. $KNO_{3(aq)}$ that doesn't react with either half cell solution.

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Why may a graphite or platinum electrode be used?







Why may a graphite or platinum electrode be used?

They are very unreactive - i.e. will not react with the half cell solutions and will not affect the voltmeter readings. Usually used in ion/ion half cells.







How do you measure comparative electrode potentials of different metals?







How do you measure comparative electrode potentials of different metals?

- Set up a voltaic cell between a $Cu_{(s)}/Cu_{(aq)}^{2+}$ ion half cell and a $Zn_{(s)}/Zn_{(aq)}^{2+}$ ion half cell.
- Use a strip of filter paper soaked in potassium nitrate solution as a salt bridge between the two half cells.
- Measure the EMF with a voltmeter connected between the two electrodes.
 [Zn(s) | Zn²⁺(aq)] and [Fe²⁺(aq) | Fe(s)]
- Repeat but for these half cell combinations:

 $[Zn(s) | Zn^{2+}(aq)] \text{ and } [Fe^{2+}(aq) | Fe(s)]$ $[Fe(s) | Fe^{2+}(aq)] \text{ and } [Cu^{2+}(aq) | Cu(s)]$ $[Zn(s) | Zn^{2+}(aq)] \text{ and } [Ag^{+}(aq) | Ag(s)]$ $[Cu(s) | Cu^{2+}(aq)] \text{ and } [Ag^{+}(aq) | Ag(s)]$









Why do you need to file / sand away the outer layer of the metal?







Why do you need to file / sand away the outer layer of the metal?

It removes the oxide layer on the outside of the metal.



