WJEC (Wales) Chemistry GCSE

SP 2.3b - Investigation into Electrolysis of Aqueous Solutions and Electroplating

Flashcards

What is electrolysis?

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Electrolysis is the splitting up of a chemical compound using electricity.

What is an electrolyte?

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An electrolyte is a liquid or solution which can conduct electricity.

What are electrodes?

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Electrodes are solids placed in the electrolyte to conduct electricity. Electrolysis has a positive electrode and a negative electrode.

What are the common names for the positive and negative electrodes?

What are the common names for the positive and negative electrodes?

Positive electrode - anode

Negative electrode - cathode

How do you set up a general electrolysis experiment?

How do you set up a general electrolysis experiment?

- Place the positive and negative electrodes in a beaker containing a molten or dissolved ionic compound.
- Connect both electrodes to a power supply with wires.

What can be used as an electrolyte?

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Molten ionic compounds or aqueous solutions can be used as the electrolyte because the ions are free to move to carry charge.

How could you investigate what happens when an aqueous solution of $CuSO_4$ is electrolysed?

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1. Half fill a beaker with aqueous $CuSO_4$.
2. Place a lid on the beaker and insert the electrodes into the solution through holes in the lid (electrodes must not touch).
3. Connect the electrodes to a low voltage power supply and switch the power supply on to 4V.
4. Turn off the power after a few minutes and record any observations

What forms at the cathode and the anode in electrolysis?

What forms at the cathode and the anode in electrolysis?

Cathode: Metals or hydrogen

Anode: Non-metals (generally oxygen and water unless halide ions are present)

How can you distinguish whether a metal or hydrogen will form at the cathode?

How can you distinguish whether a metal or hydrogen will form at the cathode?

If the metal is more reactive than hydrogen then the metal remains in the solution and hydrogen forms at the cathode. If the metal is less reactive than hydrogen then the metal forms at the cathode. The relative reactivity of the metal can be taken from the reactivity series.

What forms at the cathode and the anode in the electrolysis of $CuSO_4$?

What forms at the cathode and the anode in the electrolysis of $CuSO_4$?

Cathode: Copper (since copper is less reactive than hydrogen)

Anode: Oxygen and water

Why are carbon electrodes often used in electrolysis?

Why are carbon electrodes often used in electrolysis?

Carbon electrodes are inert. This means they won't react and interfere with the electrolysis reaction taking place.

Why might a carbon anode require regular replacement?

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The carbon anode will require replacement if oxygen is produced at the anode. This is because the carbon and oxygen will react to produce carbon dioxide, causing the electrode to wear away over time.

How could you test that oxygen was produced at the anode?

How could you test that oxygen was produced at the anode?

The gas produced will relight a glowing splint.

Explain the difference between electrolysis and electroplating

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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.