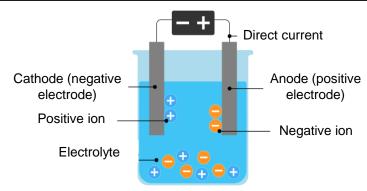
AQA C4b Electrolysis Combined Higher RP – Electrolysis

Extracting Metals Using Electrolysis

Metals can be extracted from molten or dissolved compounds using electrolysis. Aluminium is extracted in this way.

This process is used when the metal is more reactive than carbon.

It is expensive because it needs a lot of electrical energy to produce the current.



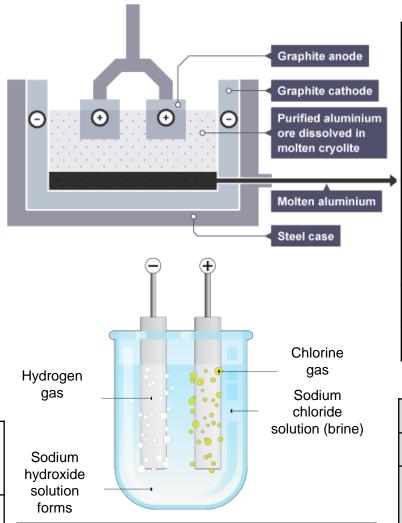
What happens in electrolysis?	When an ionic compound is melted or dissolved in water, the ions become free to move and an electrolyte is made. Passing a current through the electrolyte makes the ions move to the electrodes.
What are the electrodes called?	The positive electrode is the anode The negative electrode is the cathode
Where do the ions go?	Positive ions move to the negative electrode Negative ions move to the positive electrode

Don't P.A.N.I.C.

Positive Anode,

Negative Is Cathode

Opposite charges attract



Electrolysis of Brine

The products are H₂ Cl₂ and NaOH

Positive anode: $2Cl^-(aq) \rightarrow Cl_2(g) + 2e^$ **chlorine** used to make bleach and plastics

Negative cathode: 2H⁺(aq) + 2e⁻ → H₂(g) hydrogen used to make margarine and ammonia

In solution: Na⁺(aq) + ⁻OH(aq) → NaOH(aq)
sodium hydroxide used to make bleach and soap

Extracting Aluminium

Aluminium oxide is mixed with cryolite to reduce its melting point

aluminium oxide → aluminium + oxygen

$$2Al_2O_3(I) \rightarrow 4AI(I) + 3O_2(g)$$

Aluminium forms at the negative electrode (cathode)

Oxygen forms at the positive electrode (anode)

$$2O^{2-}(I) \rightarrow O_2(g) + 4e^{-}$$

OIL RIG - Oxidation Is Loss (of electrons), Reduction Is Gain (of electrons)

Oxygen reacts with the carbon electrodes to produce carbon dioxide, so the electrode burns away and has to be replaced

$$C(s) + O_2(g) \rightarrow CO_2(g)$$

Electrolysis of Solutions	
In water (aqueous solution): H ₂ O (I) ⇌ H ⁺ (aq) + OH (aq)	
at the negative electrode	The metal will be produced on the electrode if it is less reactive than hydrogen, e.g. copper Hydrogen will be produced if the metal is more reactive than hydrogen., e.g. sodium
at the positive electrode	If you have a halide ion (Cl ⁻ , l ⁻ , Br ⁻) then you will get chlorine, bromine or iodine formed. Otherwise oxygen is formed at positive electrode from the hydroxide ion.