



# Chemistry Knowledge Organiser

## Electrolysis (Trilogy Science)

### Ionic compounds – conducting electricity

When **solid** ions are in fixed positions.

When **molten** or **aqueous**, ions can carry the charge – these liquids are called **electrolytes**

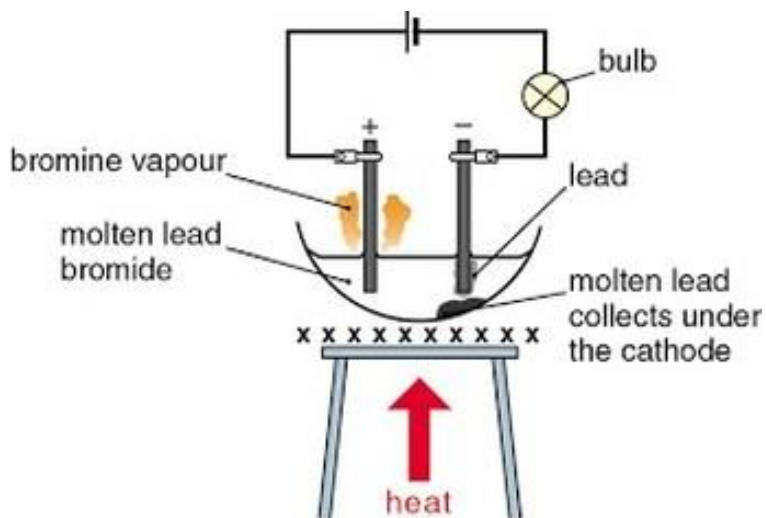
### Electrolysis of molten ionic compounds

**Metal ions** have **positive** charges

**Non-metal** ions have **negative** charges

**Positive electrode (anode)** – negative ions attracted and are discharged, losing electrons (oxidation), forming the element.

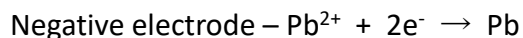
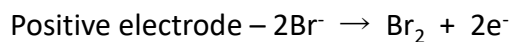
**Negative electrode (cathode)** – positive ions attracted and are discharged, gaining electrons (reduction), forming the element.



### Electrode equations (higher only)

Charges balanced by adding electrons to more positive side.

For example, electrolysis of molten lead bromide:

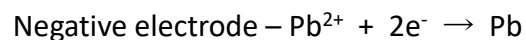
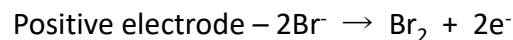
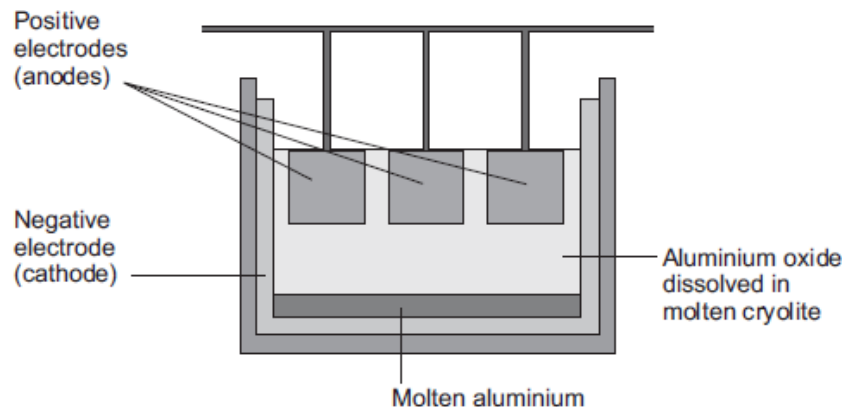


### Extracting metals by electrolysis

Electrolysis is used when the metal is **more reactive** than carbon.

Large amounts of energy are used to melt the compounds and produce the electrical current.

Aluminium is extracted by electrolysis of a mixture of aluminium oxide and **cryolite** – the cryolite **lowers the melting point** of the aluminium oxide so less energy is needed.



Positive **carbon** electrodes must be **continually replaced** as the oxygen produced **reacts** with them forming carbon dioxide.



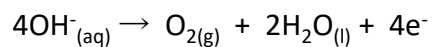
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## Electrolysis (Trilogy Science)

### Electrolysis of aqueous ionic compounds

H<sup>+</sup> and OH<sup>-</sup> ions also present from the water

**Positive electrode (anode)** – both OH<sup>-</sup> ion and non-metal ion are attracted, **OH<sup>-</sup> ion is discharged** unless the non-metal ion is a **halide** (Cl<sup>-</sup>, Br<sup>-</sup> or I<sup>-</sup>) forming oxygen gas



**Negative electrode (cathode)** – both H<sup>+</sup> ion and metal ion are attracted, **H<sup>+</sup> ion is discharged** unless the metal is less reactive than hydrogen (e.g. copper or silver)

