4 Electrolysis – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	**Write it 3 times** (English)		
Electrolysis			
ionic compound			
electric current			
molten			
ions			
electrodes			
electrolyte			
anode			
cathode			
inert			
metals			
hydrogen			
non-metals			
reduction			
oxidation			

Recall

Electrolysis breaks down an **ionic compound** by passing an **electric current** through it (when it is **molten** or dissolved).

- It works only when the **ions** are free to move.
- A solid ionic compound cannot be electrolysed (its ions are locked in place).

Nothing here is hard – it just names the parts.

New ideas

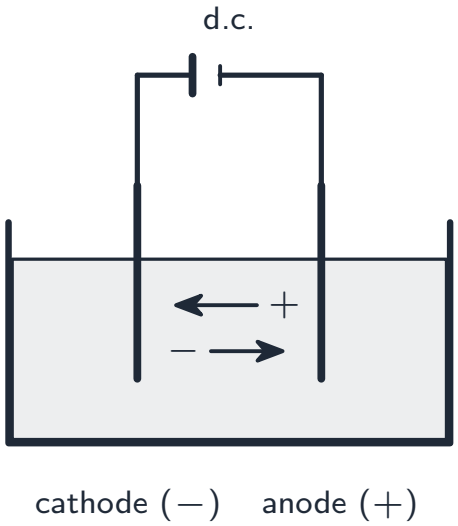
Read these first, then do the Practice.

1 The electrolytic cell

Two **electrodes** dip into the **electrolyte** (the molten/dissolved substance):

- the **anode** is the **positive** (+) electrode.
- the **cathode** is the **negative** (−) electrode.

The electrodes are often **inert** (carbon or platinum). Positive ions move to the cathode; negative ions move to the anode.



2 What forms at each electrode

A simple rule:

- **metals** or **hydrogen** form at the **cathode** (−).
- **non-metals** (other than hydrogen) form at the **anode** (+).

cathode (−) ⟶ metal or hydrogen

anode (+) ⟶ non-metal

Example. Molten lead(II) bromide → **lead** at the cathode, **bromine** at the anode.

3 Reduction and oxidation

- at the cathode, positive ions **gain** electrons – this is **reduction** .
- at the anode, negative ions **lose** electrons – this is **oxidation** .

Watch out: remember **PANIC** – Positive Anode, Negative Is Cathode. Positive ions go to the cathode and **gain** electrons (reduction); negative ions go to the anode and **lose** electrons (oxidation).

Practice

Try these in order.

4.1 Why must an ionic compound be molten or dissolved to be electrolysed? [2]

4.2 State which electrode is (a) the positive one, (b) the negative one. [2]

4.3 What forms at (a) the cathode, (b) the anode (give the rule)? [2]

4.4 Molten lead(II) bromide is electrolysed. Name the product at (a) the cathode, (b) the anode. [2]

4.5 Is gaining electrons oxidation or reduction? [1]

4.6 Challenge. Molten aluminium oxide is electrolysed. Name the product at (a) the cathode and (b) the anode, and state which product's ions are *reduced*. [3]