4 Electrolysis – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)		
Electrolysis	电解			
ionic compound	离子化合物			
electric current	电流			
molten	熔融			
ions	离子			
electrodes	电极			
electrolyte	电解质			
anode	阳极			
cathode	阴极			
inert	惰性			
metals	金属			
hydrogen	氢气			
non-metals	非金属			
reduction	还原			
oxidation	氧化			

Recall

Electrolysis 电解 breaks down an **ionic compound** 离子化合物 by passing an **electric current** 电流 through it (when it is **molten** 熔融 or dissolved).

- It works only when the **ions** 离子 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

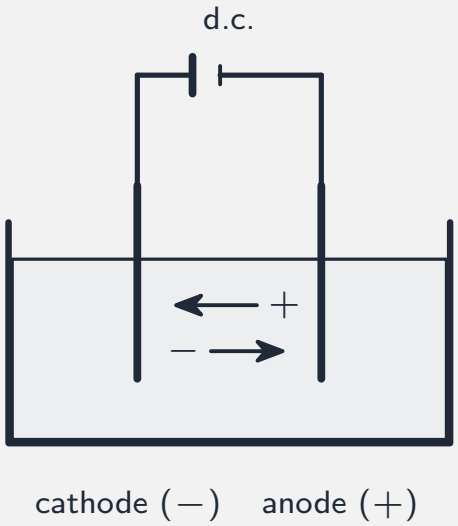
Read these first, then do the Practice.

1 The electrolytic cell

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

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

The electrodes are often **inert** 惰性 (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** 金属 or **hydrogen** 氢气 form at the **cathode** (−).
- **non-metals** 非金属 (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** 还原.
- at the anode, negative ions **lose** electrons —this is **oxidation** 氧化.

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]