

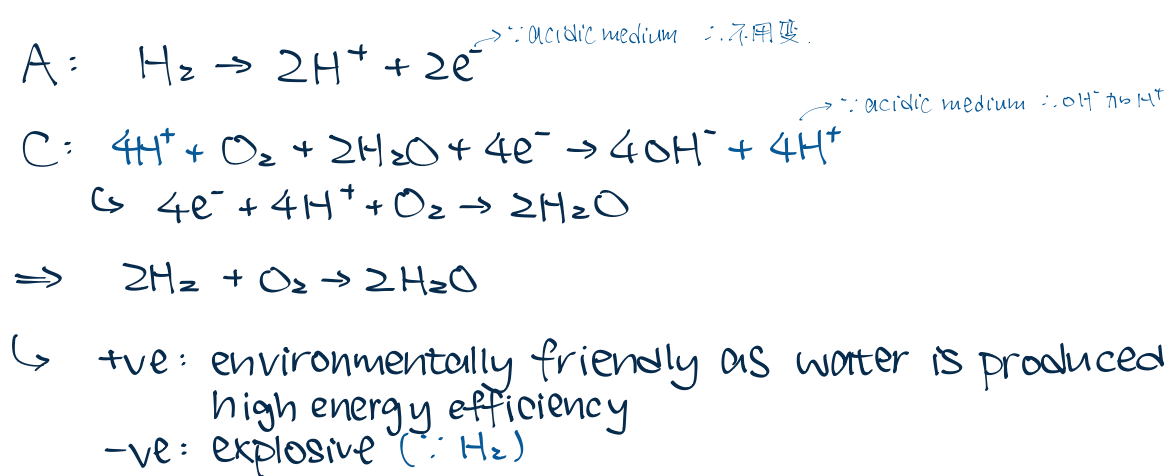
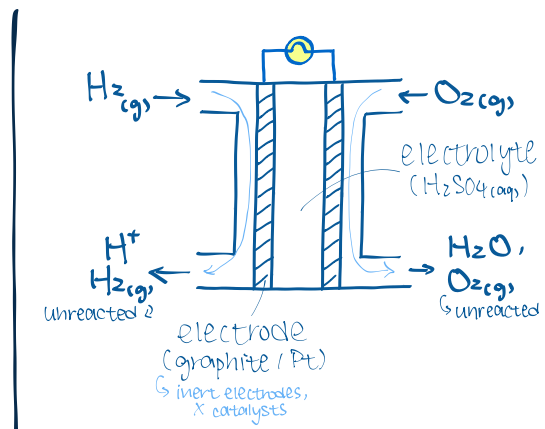
Fuel cells

1 Principle

- Combustion of fuel ($\text{fuel} + \text{O}_2 \rightarrow \dots$)
- hazard warning labels: flammable + oxidizing
fuel (燃料) O_2 (助燃料)
- advantages
 - > environmentally friendly as water is produced eg. for hydrogen fuel cells
 - > high energy efficiency.
- 注意 electrolyte 为 acidic / alkaline medium
 - > acidic: OH^- 加 H^+
 - > alkaline: H^+ 加 OH^-
 - > carbonate (CO_3^{2-}): 转做 acidic medium (OH^- 加 H^+), 再加 CO_3^{2-} ($2\text{H}^+ + \text{CO}_3^{2-} \rightarrow \text{CO}_2 + \text{H}_2\text{O}$) Acid-base

2 Examples

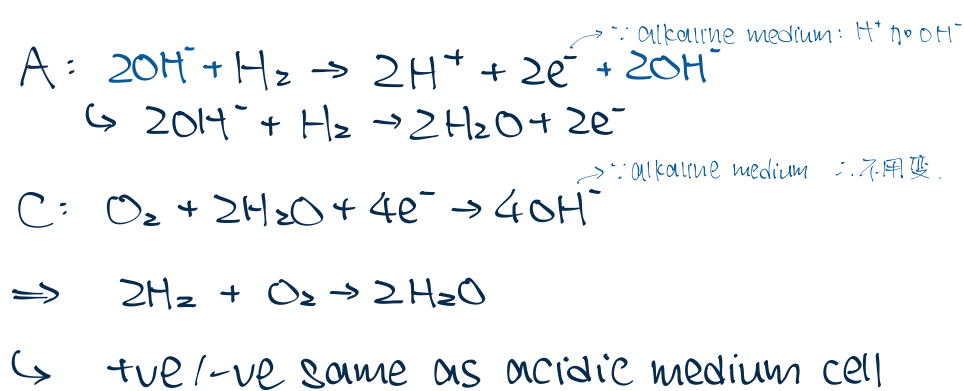
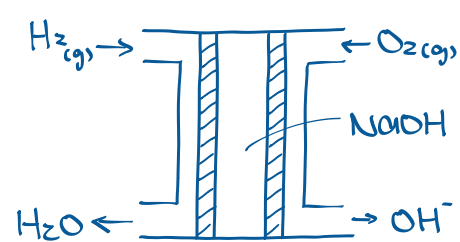
HYDROGEN FUEL CELLS, ACIDIC MEDIUM



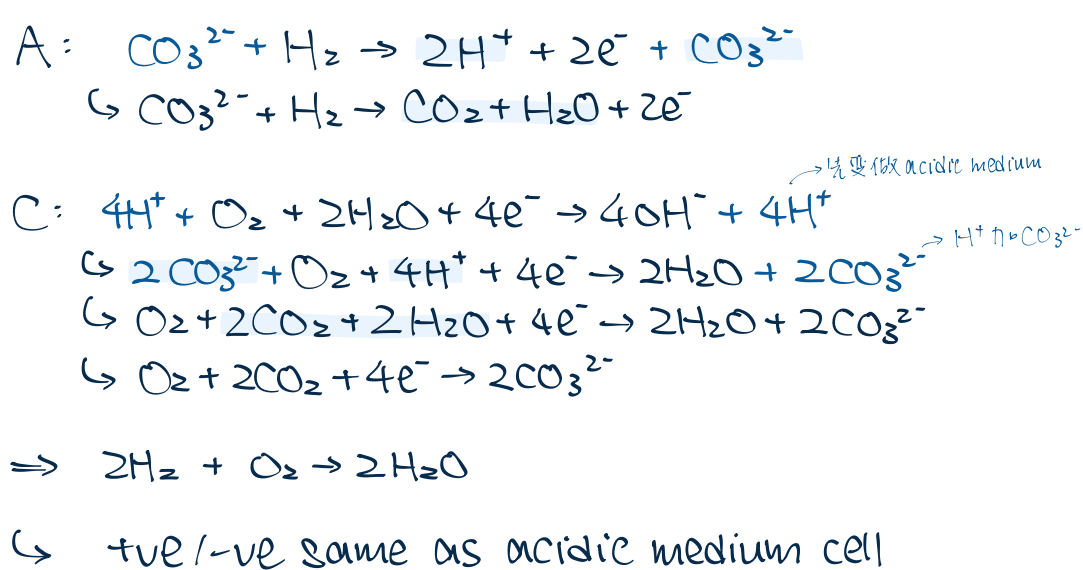
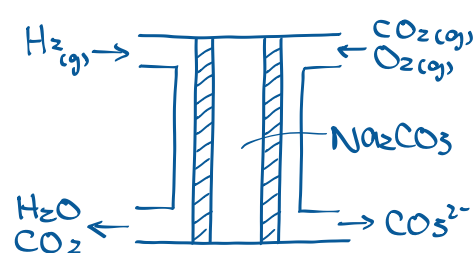
For hydrogen fuel cells

- overall eqn.
 - > 无论如何也是 $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- Acidic medium
 - > Anode: H^+ , Cathode: H_2O
- Alkaline medium
 - > Anode: H_2O , Cathode: OH^-

HYDROGEN FUEL CELLS, ALKALINE MEDIUM



HYDROGEN FUEL CELLS, CARBONATE MEDIUM



OTHER FUEL CELLS

