

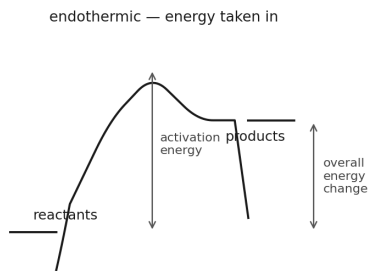
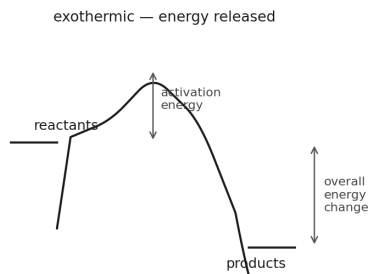
Exercise walk-through

5.2

Chemical cells and fuel cells – chemistry only (4.5.2)

AQA · GCSE · Chemistry

Reaction profiles



- Collisions need at least the activation energy.
- Exothermic — products below reactants; endothermic — above.
- Label the activation energy and overall change arrows.

Exercises 2.1·2.3

2.1 What two factors does a cell's voltage depend on? [2]

2.2 Why can rechargeable cells be reused? [1]

2.3 What is the only product of a hydrogen fuel cell? [1]

Exercises 2.1·2.3

2.1 What two factors does a cell's voltage depend on? [2]

2.1 The type of electrode (metal); the electrolyte.

2.2 Why can rechargeable cells be reused? [1]

2.2 The chemical reactions are reversed by an external electrical current on recharging.

2.3 What is the only product of a hydrogen fuel cell? [1]

2.3 Water.

Exercises 3.1·3.3

3.1 Describe how a simple cell is made and explain why the voltage changes when one metal is swapped. [4]

3.2 Evaluate a hydrogen fuel cell against a rechargeable battery for powering a car – two advantages and two disadvantages. [4]

3.3 (*HT*) Write the half-equations and the overall equation for a hydrogen fuel cell. [4]

Exercises 3.1·3.3

3.1 Describe how a simple cell is made and explain why the voltage changes when one metal is swapped. [4]

3.1 Two different metals connected in contact with an electrolyte; the more reactive metal is oxidised, releasing electrons that flow through the wire; the bigger the difference in reactivity between the metals, the higher the voltage; so swapping one metal changes the reactivity difference and the voltage.

3.2 Evaluate a hydrogen fuel cell against a rechargeable battery for powering a car – two advantages and two disadvantages. [4]

3.2 Advantages: only water is produced – no polluting exhaust; refuelling is quick and continuous, unlike long recharge times. Disadvantages: hydrogen is difficult and dangerous to store; most hydrogen is made using energy from fossil fuels, and fuel cells are expensive.

3.3 (*HT*) Write the half-equations and the overall equation for a hydrogen fuel cell. [4]

3.3 Negative electrode: $2 \text{H}_2 \rightarrow 4 \text{H}^+ + 4\text{e}^-$. Positive electrode: $\text{O}_2 + 4 \text{H}^+ + 4\text{e}^- \rightarrow 2$