IGCSE CHEMISTRY • EXERCISE SHEET

4.2 Hydrogen-oxygen fuel cells

Name: _____ Class: _____ Date: _____ **Total: 7 marks**

Objective

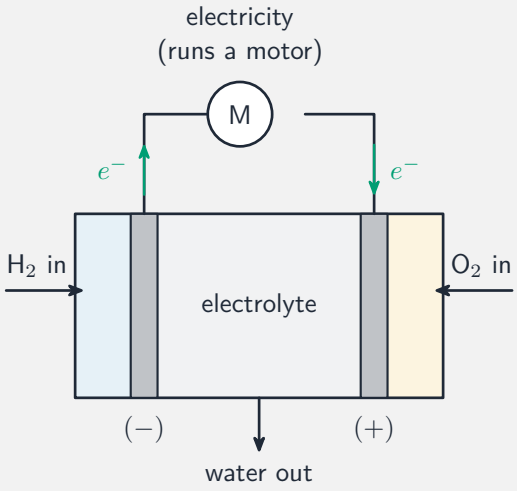
Build the skills to answer exam questions on **hydrogen–oxygen fuel cells** 氢氧燃料电池—how they work and how they compare with a petrol engine.

You must be able to:

- give the overall reaction in a hydrogen–oxygen fuel cell
- state the advantages and disadvantages vs a petrol engine
- explain why the only product is water

1 Worked examples

The fuel cell



overall: $2H_2 + O_2 \rightarrow 2H_2O$

A fuel cell turns chemical energy straight into electricity; water is the only product

$$2H_2 + O_2 \rightarrow 2H_2O$$

- **advantage:** only product is water —no air pollution.
- **disadvantage:** hydrogen is hard/dangerous to store; making it may use fossil fuels.

2 Practice

2.1 Write the overall equation for a hydrogen–oxygen fuel cell. [1]

2.2 State the only chemical product of the fuel cell. [1]

3 Exam-style questions

3.1 A key advantage of a hydrogen fuel cell over a petrol engine is that it: [1]

- **A** is easier to refuel
- **B** produces only water, not pollutants
- **C** uses no energy
- **D** stores its fuel more easily

3.2 Compare a hydrogen–oxygen fuel cell with a petrol engine.

(a) Give one advantage of the fuel cell. [1]

(b) Give one disadvantage of the fuel cell. [1]

3.3 Explain why using a hydrogen fuel cell may still cause some pollution overall. [2]

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **4.2 Hydrogen–oxygen fuel cells** past-paper sheet in the Library, or try these in **Practice mode**:

- 0620/22 N25 —Q12 (fuel cells)
- 0620/23 N25 —Q15 (fuel cells)

Solutions

2.1 $2H_2 + O_2 \rightarrow 2H_2O$.

2.2 water.

3.1 B. It produces only water, not pollutants.

3.2 (a) the only product is water, so it does not pollute the air.
(b) hydrogen is hard/dangerous to store and transport.

3.3 the hydrogen fuel is often made using energy from fossil fuels; burning those fuels releases pollutants/carbon dioxide elsewhere.