AQA GCSE Chemistry

Topic 5: Energy changes

Chemical cells and fuel cells (chemistry only)

Notes

(Content in bold is for Higher Tier only)

Cells and batteries

- Cells contain chemicals which react to produce electricity
- The voltage produced by a cell is depended upon a number of factors
    - E.g. type of electrode & electrolyte
- A simple cell can be made by connecting two different metals in contact with an electrolyte
- Batteries = two or more cells connected together in series to provide a greater voltage
- Non-rechargeable cells & batteries:
    - Chemical reactions stop when one of the reactants has been used up
    - Alkaline batteries are non-rechargeable
- Rechargeable cells & batteries:
    - Can be recharged because the chemical reactions are reversed when an external electrical current is supplied

Fuel cells

- Supplied by an external source of fuel (e.g hydrogen) and oxygen or air. the fuel is oxidised electrochemically within the fuel cell to produce a potential difference
- Overall reaction a hydrogen fuel cell involves the oxidation of hydrogen to produce water
- Hydrogen fuel cells offer a potential alternative to rechargeable cells & batteries:

hydrogen fuel cell	rechargeable cells and batteries
fuel cells can be used constantly provided fuel keeps being put in	can be recharged by reversing reaction, so fuel doesn't need to keep being supplied
hydrogen is a gas so needs to be stored at high pressure and so is harder to transport	hard to dispose of- non-biodegradable
only produces water when burnt	will eventually stop working

- **equations for each half cell:**
    - **At the anode (positive electrode): $H_2(g) \rightarrow 2e^- + 2H^+(aq)$**
    - **At the cathode (negative electrode): $4H^+(aq) + O_2(g) + 4e^- \rightarrow 2H_2O(g)$**