ENGINEERING CHEMISTRY

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Energy storage devices – Fuel cells

Class content:

- ***Fuel cells***
  - ***Principle and working***
  - ***Advantages***
  - ***Disadvantages***
  - ***Applications***

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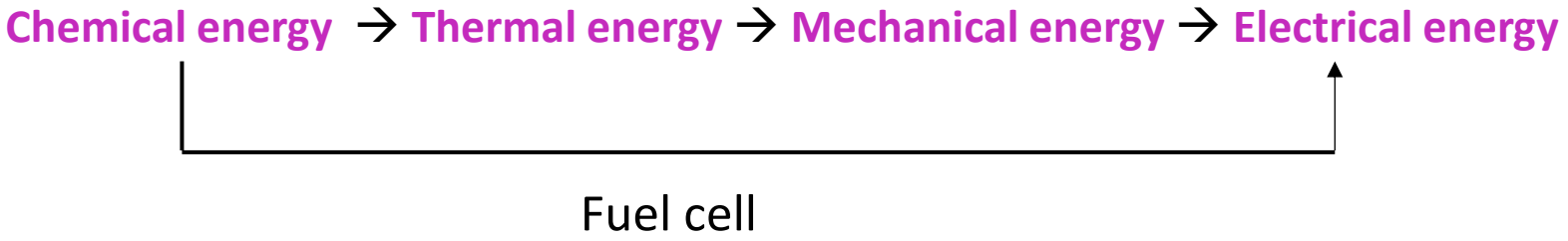
Fuel cells



- Galvanic cell which converts chemical energy of a fuel oxidant system **directly** into electrical energy by means of **redox reactions**
- **Do not store energy** but convert chemical energy in the fuel to electrical energy
- Fuel and oxidising agents have to be **continuously supplied** at the respective electrodes
- Generate power as long as the electroactive material is supplied

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Working:

Anode : Fuel → Oxidation product + ne^-

Cathode : Oxidant + ne^- → Reduction products

Fuels : H_2, CO, CH_3OH, C_2H_5OH, HCHO, N_2H_4

Oxidants: O_2 , H_2O_2, halogens

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Advantages :

- High power efficiency (about 50 - 80%)
- Ecofriendly - products formed are not toxic
- Silent operation

Disadvantages :

- Cost of the power is high as a result of the use of expensive electrodes and catalysts
- Power out put is moderate
- Fuels in the form of gases and oxygen need to be stored in tanks under high pressure-special equipment is required

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Applications:

- Space exploration; as auxiliary power generators in space vehicles
- Vehicle traction for cars, buses and commercial vehicles
- Large scale power generation

THANK YOU

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