

UNIT IV

FUEL CELL

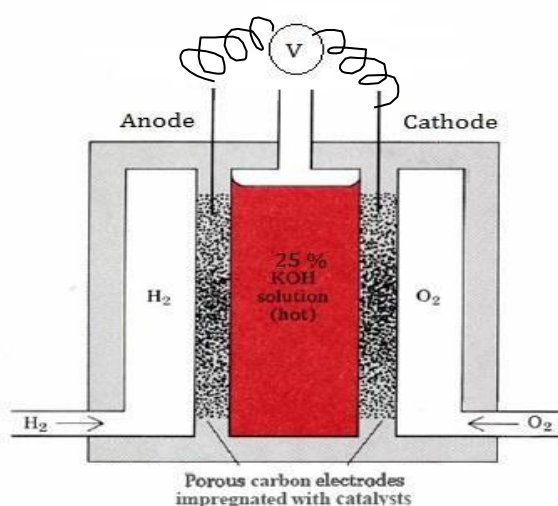
H₂ – O₂ Fuel Cell

It is the simplest fuel cell generates electricity through the chemical reaction of hydrogen and oxygen(pure).

The basic structure consists of two electrodes, anode and cathode that are separated by an electrolyte. **Hydrogen gas is supplied to the anode**, where it splits into protons and electrons. The protons pass through the electrolyte, while the electrons travel through an external circuit, generating electricity. At the cathode, oxygen combines with the protons and electrons to form water.

Description

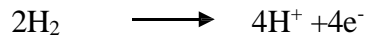
- ❖ Fuel – H₂
- ❖ Oxidant – O₂
- ❖ Electrolyte – liq. NaOH(or) KOH (25%)
- ❖ Anode & cathode – porous electrode made of compressed carbon (Graphite rod), with little amount of catalyst (Pt, Pd, Ag)
- ❖ Electrodes are connected through a voltmeter.



Working Principle:

At Anode

- H₂ gas is bubbled through anode compartment
- H₂ is oxidized

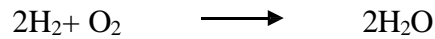


At cathode

- O₂ gas is bubbled through cathode compartment
- O₂ is reduced



Over all Reaction



This type of fuel cell operates at low to medium temperatures and offers high efficiency with only water as a byproduct, making it environmentally friendly. It's commonly used in transportation, stationary power and backup power applications.

Advantages

- Efficiency is 70% greater than other energy sources.
- Environmentally friendly, byproduct is water

Disadvantages

- High cost
- Safety issues, hydrogen is flammable

Applications

- Used as energy source in space vehicles, sub marines tec.
- The product obtained water is a source of freshwater for the astronauts.