



19CH201 - ENGINEERING CHEMISTRY FOR CIRCUIT BRANCHES

UNIT-2 - ENERGY STORAGE DEVICES

2.9. H₂-O₂ Fuel Cell

Definition

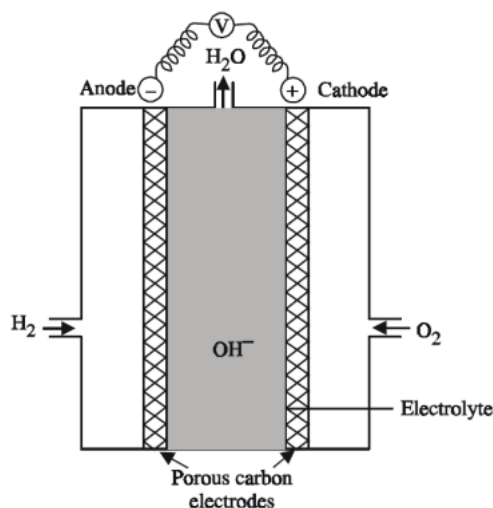
Fuel cell is a voltaic cell. It converts chemical energy of the fuels directly into electricity without combustion. In these cells, the reactants and electrolytes are continuously supplied to the cell.



Examples: Hydrogen - oxygen fuel cell.

Hydrogen - oxygen fuel cell

It is the simplest and most successful fuel cell. The fuel-hydrogen and the oxidiser-oxygen and the liquid electrolyte are continuously supplied to the cell.



Description

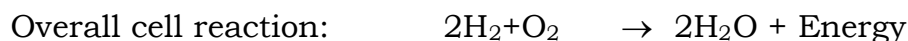
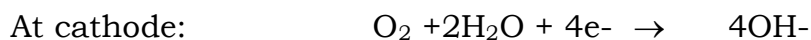
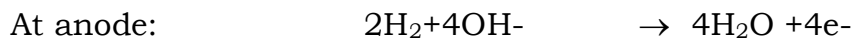
The cell has two porous electrodes, anode and cathode. The electrodes are made of compressed carbon containing a small amount of catalyst (Pt, Pd, Ag). Between the two electrodes an electrolytic solution, 25% KOH is filled.



Working

Hydrogen passes through the anode compartment, where it is oxidized. Oxygen passes through the cathode compartment, where it is reduced.

Cell reactions



The emf of the cell = 0.8 to 1.0V

Advantages of Fuel Cells

1. They are efficient and instant in operation.
2. They are pollution free.
3. They produce electric current directly from the reaction of a fuel and an oxidizer.
4. They are light in weight

Disadvantages

1. Fuel cells cannot store electric energy.
2. Electrodes are expensive and short lived.
3. H₂ should be pure.

Applications

1. H₂ - O₂ fuel cells are used in space crafts, submarines to get electricity
2. In H₂ - O₂ fuel cell, the product water is a valuable source of fresh water for astronauts



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