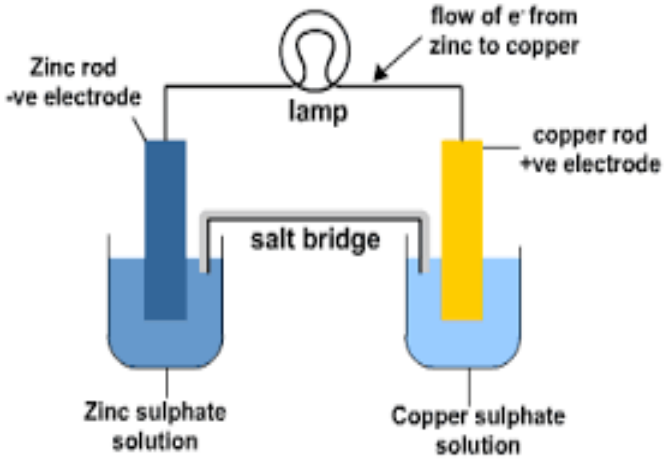
ELECTROCHEMICAL CELLS

Electrochemical cells or galvanic cells are the device which converts chemical energy into electrical energy. Here, the electricity is produced by a spontaneous redox cell reaction.
Example : Daniel cell .



It consists of a zinc electrode dipped in 1 M zinc sulphate solution and a copper electrode dipped in 1 M copper sulphate solution. Each electrode is considered as a half cell. The two standard half cells are coupled by salt bridge and to form a cell. The electrode reactions are as follows:
At anode : Zinc passes into solution as zinc ion and liberates two electrons at the electrode. Here, oxidation reaction occurs at the zinc electrode.

$$Zn \longrightarrow Zn^{2+} + 2e^{-} \text{ (oxidation)}$$

At cathode: Copper ion gains two electrons, reduced to metallic copper and deposited at the copper electrode. Here, reduction reaction occurs at the copper electrode.

$$Cu^{2+} + 2e^{-} \longrightarrow Cu \text{ (Reduction).}$$

Now, both zinc and copper electrodes are connected through the external wire. The excess of electron liberated by the oxidation reaction flows along the wire in order to neutralize the positive charge on the copper electrode. This movement of electrons from Zn to Cu electrode produces current in the circuit (1.1 V).

Salt Bridge
It bridges the two half cells and hence the name. A saturated solution of KCl or NH4NO3 in agar-agar gel is taken in U-tube and used as a salt bridge.

Function of Salt Bridge

1) It prevents the physical contact of electrolytic solution in two half cells.
2) It maintains the internal electrical continuity between two half cells.
3) It eliminates the liquid junction potential.