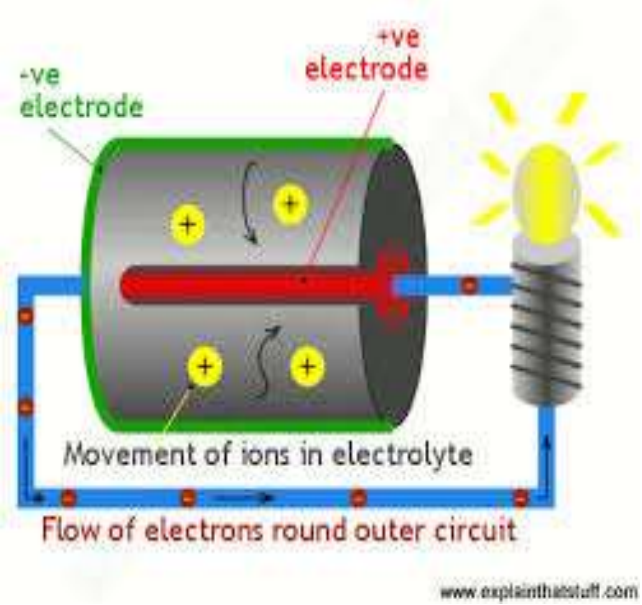
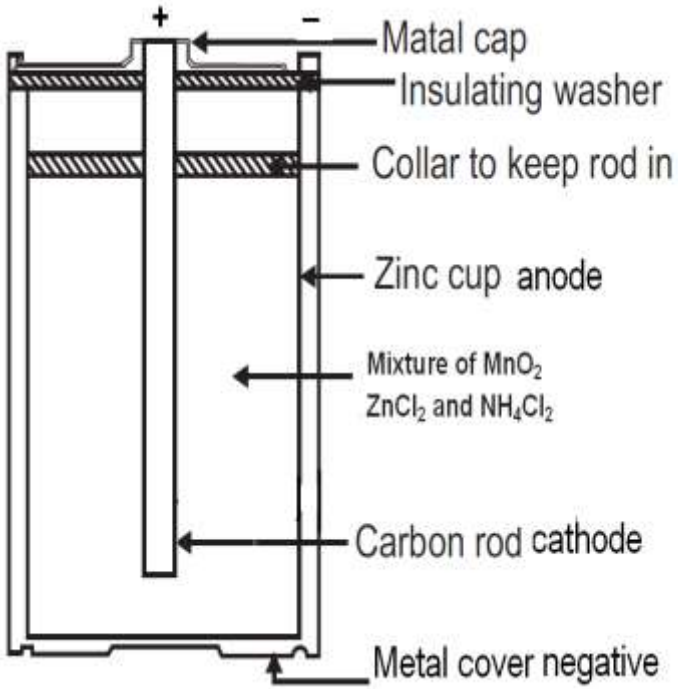
Primary Batteries

Alkaline Batteries:



Working of battery:

- It is improved from of dry cell.
- It consists of a zinc cylinder filled with an electrolyte consisting of powdered Zn, KOH and Mno2 in the form of paste using starch and water.
- A carbon rod (graphite) ,acts as cathode, is immersed in the electrolyte in the center of the cell.
- The outside cylinderical zinc body acts as anode.


+
–
Matal cap
Insulating washer
Collar to keep rod in
Zinc cup anode
Mixture of MnO_2
$ZnCl_2$ and NH_4Cl_2
Carbon rod cathode
Metal cover negative


POSITIVE CAP
OUTER SLEEVE
CATHODE CURRENT COLLECTOR
CATHODE
SEPARATOR
ANODE
ANODE CURRENT COLLECTOR
PLASTIC GROMMET
MEMBRANE VENT
INSULATOR
NEGATIVE CAP

ALKALINE BATTERIES

Cell Reactions:

Anodic Reaction:

$$Zn_{(s)} + 2\,OH^-_{(aq)} \longrightarrow Zn(OH)_{2(s)} + 2e^-$$

Cathodic Reaction:

$$2MnO_{2(s)} + H_2O_{(l)} + 2e^- \longrightarrow Mn_2O_{3(s)} + 2\,OH^-_{(aq)}$$

Overall reaction:

$$Zn_{(s)} + 2MnO_{2(s)} + H_2O_{(l)} \longrightarrow Zn(OH)_2 + Mn_2O_{3(s)}$$

In cathode reaction , Mn is reduced from +4 oxidation stateto +3 oxidation state.

The emf of the cell is 1.5 V.

ALKALINE BATTERIES

Advantages of alkaline battery over dry battery:

- Zinc does not dissolve readily in a basic medium.
- The life of alkaline battery is longer than dry battery.
- Alkaline battery maintains its voltage, as the current is drawn from it.

Uses:

Dry cells are used in flash-lights, transistor radios, calculators, etc