

CHAPTER - 14

CHEMICAL EFFECTS OF ELECTRIC CURRENT

CONDUCTORS AND INSULATORS

- **Conductors :** Substances which allow electric current to pass through them are called conductors
- **Insulators:** Substances which does not allow electric current to pass through them are called insulators.

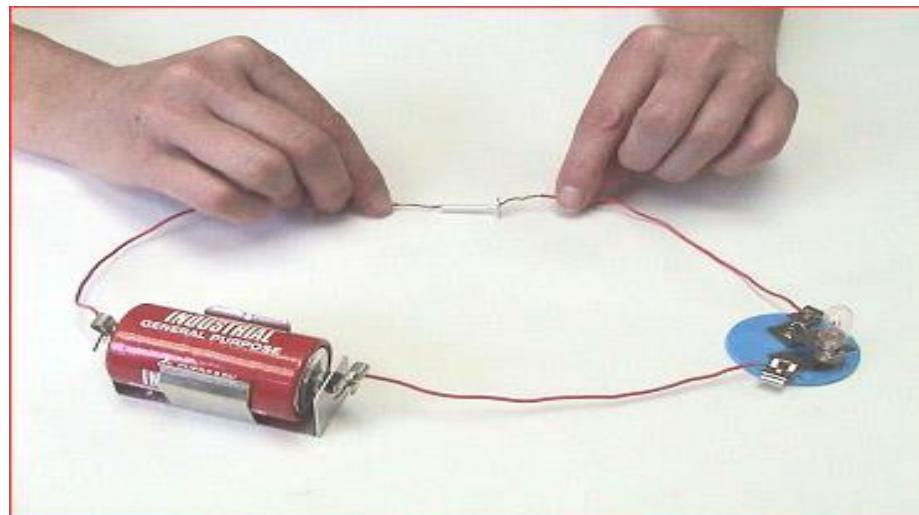
TESTING CONDUCTIVITY OF SUBSTANCES

A conduction tester is a device used to determine whether a substance is a good or poor conductor of electricity.

Conduction tester using a torch bulb :-

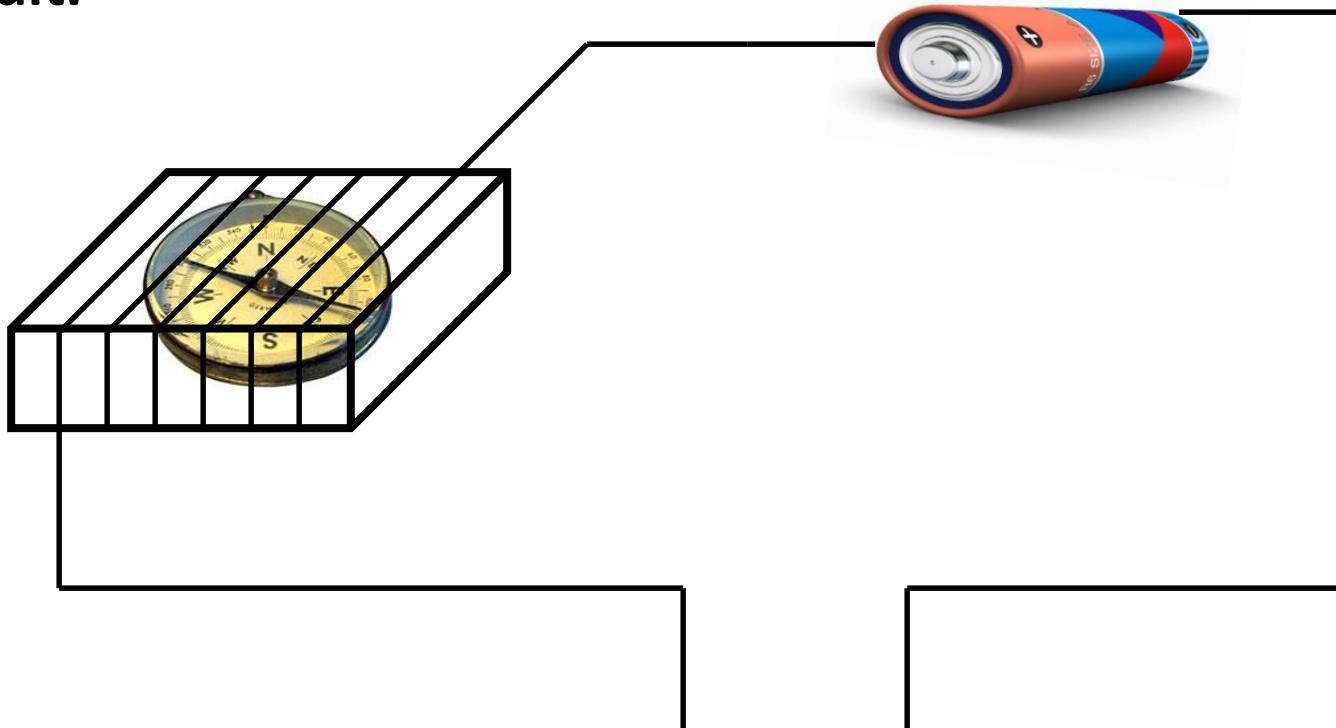
A simple conduction tester has an electric cell and a torch bulb. One terminal of the cell is connected to one terminal of the bulb by a wire. The other terminal of the cell and bulb have wires which can be brought in contact with materials to test whether they are good or poor conductors of electricity.

If the material is a good conductor, the bulb glows and if it is a poor conductor the bulb does not glow.



ELECTRIC CURRENT PRODUCES MAGNETIC FIELD :

If a magnetic compass is kept near a wire and current flows through the wire, the magnetic needle gets deflected. So we can use a magnetic compass instead of a torch bulb or LED in the circuit. The magnetic needle gets deflected even if a weak current flows in the circuit.



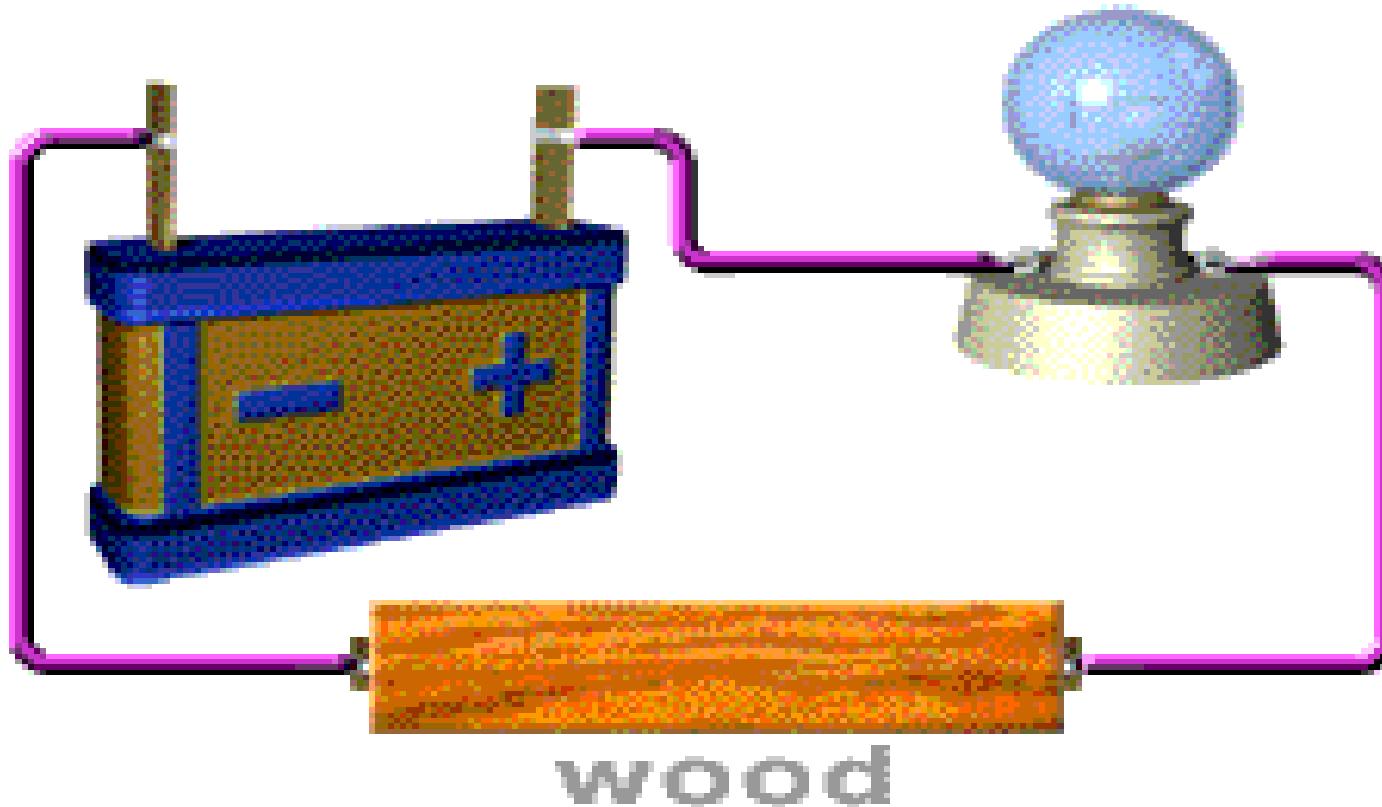
ELECTRICAL CONDUCTIVITY OF SOLIDS :-

Some solids are good conductors of electricity.

Eg :- copper, steel, iron, aluminium etc.

Some solids are poor conductors of electricity.

Eg :- wood, plastic, rubber, glass etc.



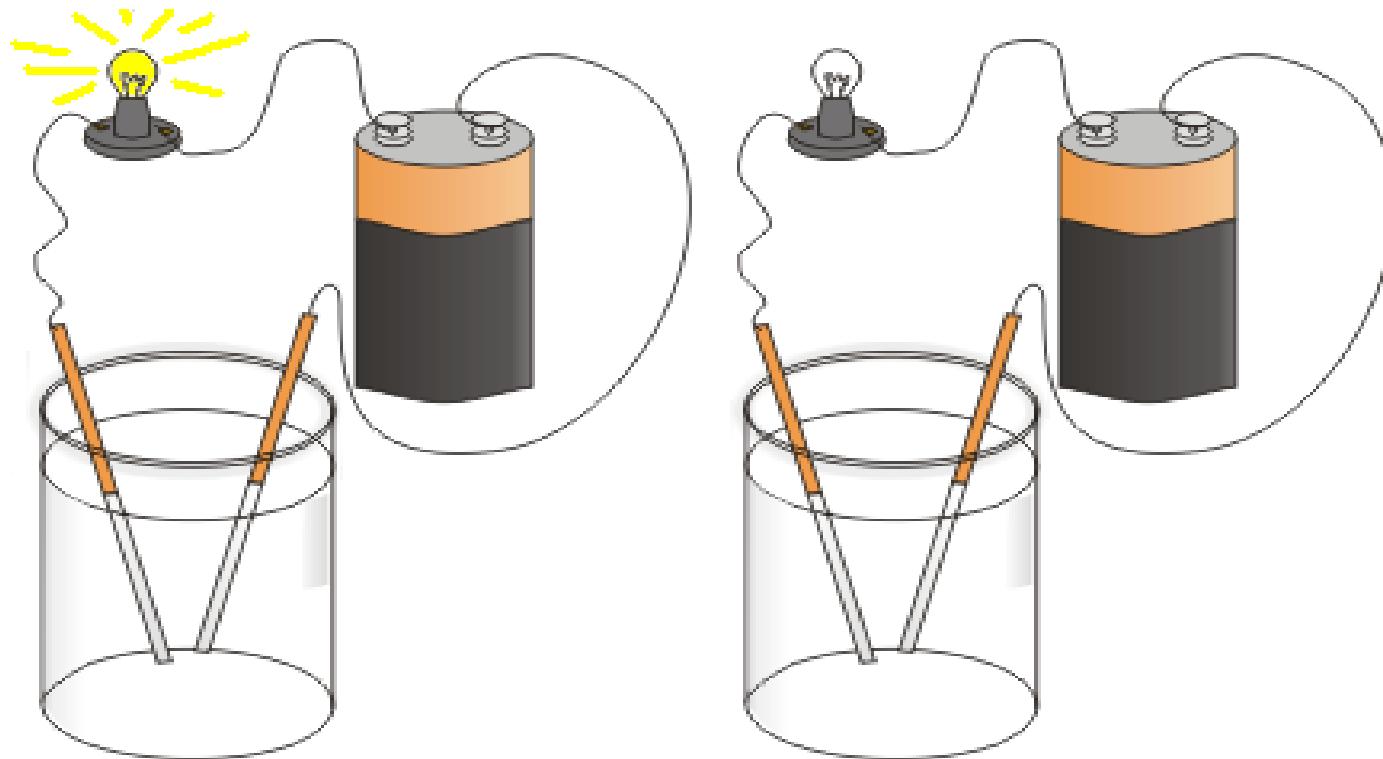
ELECTRICAL CONDUCTIVITY OF LIQUIDS :-

Some liquids are good conductors of electricity.

Eg :- tap water, salt solution, hydrochloric acid, sodium hydroxide etc.
(solutions of acids, bases and salts are conductors of electricity)

Some liquids are poor conductor of electricity .

Eg :- distilled water, sugar solution, kerosene, spirit etc.

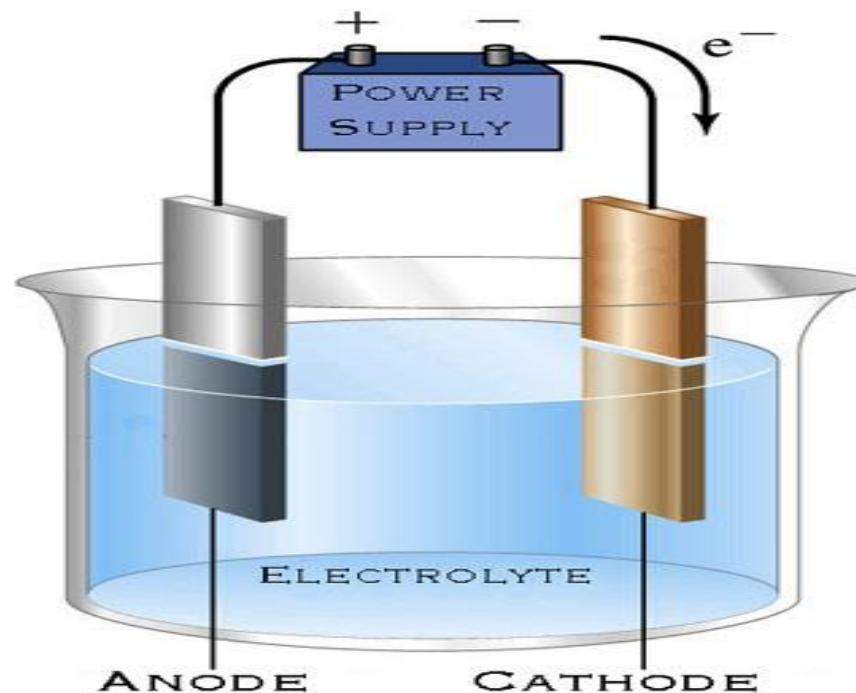


CHEMICAL EFFECTS OF ELECTRIC CURRENT :-

When electric current passes through a conducting solution, it causes chemical reactions. This is called chemical effect of electric current.

Chemical effect of electric current may cause :-

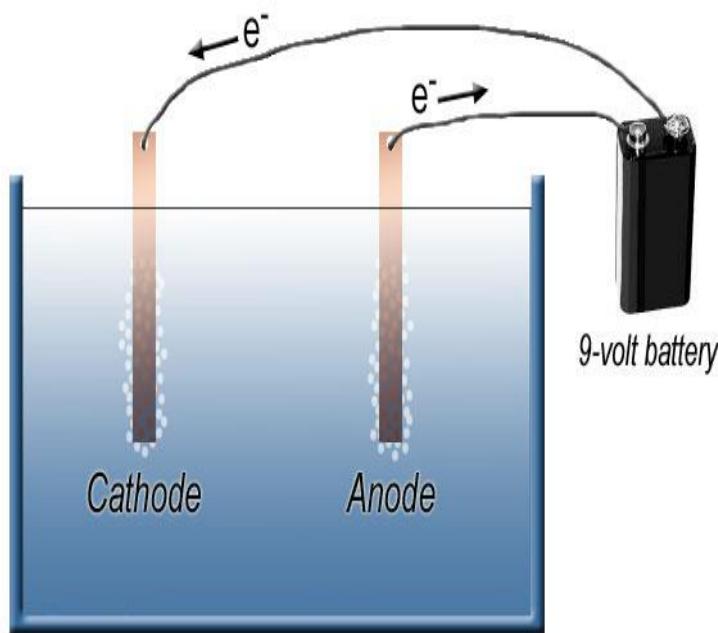
- i) Formation of gas bubbles at the electrodes.
- ii) Deposit of metal on the electrodes.
- iii) Change in colour of the solution.



ELECTROLYSIS OF WATER :-

When electric current is passed through water, it splits up into hydrogen and oxygen. This is called electrolysis of water.

When electric current is passed through water oxygen gas bubbles are produced at the electrode connected to the positive terminal of the battery and hydrogen gas bubbles are produced at the electrode connected to the negative terminal of the battery.

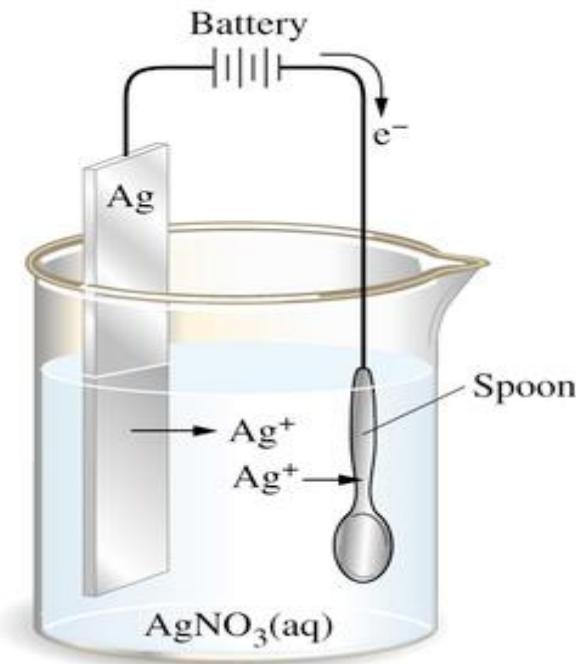
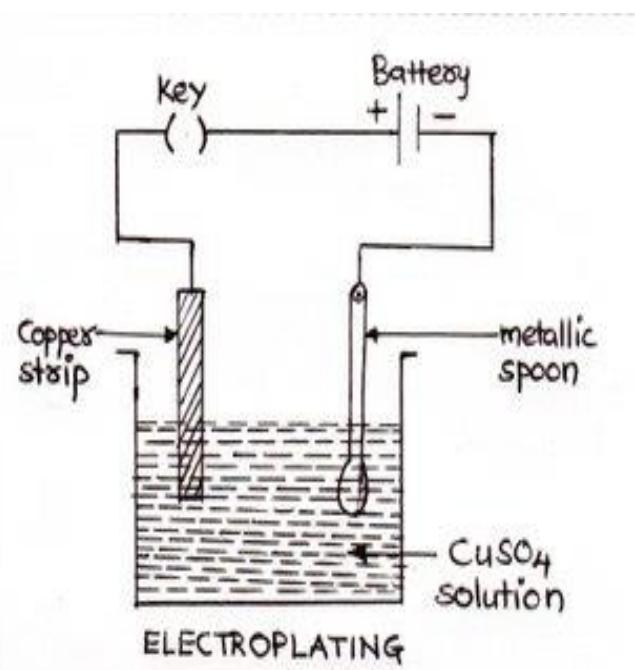


Set-up for electrolysis experiment

ELECTROPLATING :-

The process of depositing a layer of any desired metal on another material by means of electricity is called electroplating.

Eg:- For electroplating of copper on an object, the object is dipped in acidified copper sulphate solution and connected to the negative terminal of a battery. A copper strip is dipped in the solution and connected to the positive terminal of the battery. When electric current is passed through the solution, copper from the copper strip is deposited on the object.



USES OF ELECTROPLATING :-

Electroplating is used in industry for coating metal objects with a thin layer of a desired metal.

Chromium has a shiny appearance and it does not corrode. Chromium plating is done on objects like bicycle parts, car parts, taps, gas burners, wheel rims etc.

Jewellery makers electroplate gold and silver on less expensive metals to give an appearance of gold or silver.

Tin cans used for storing food are electroplated with tin over iron because tin is less reactive than iron and protects iron from corrosion.

Iron objects are coated with zinc to protect it from corrosion.

