CHEMICAL EFFECTS OF ELECTRIC CURRENT

9TH CLASS

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Good Conductors

Materials, which allow electric current to pass through them, are good conductors of electricity.

Example: Metals, Human body etc.


Copper


Silver


Graphite

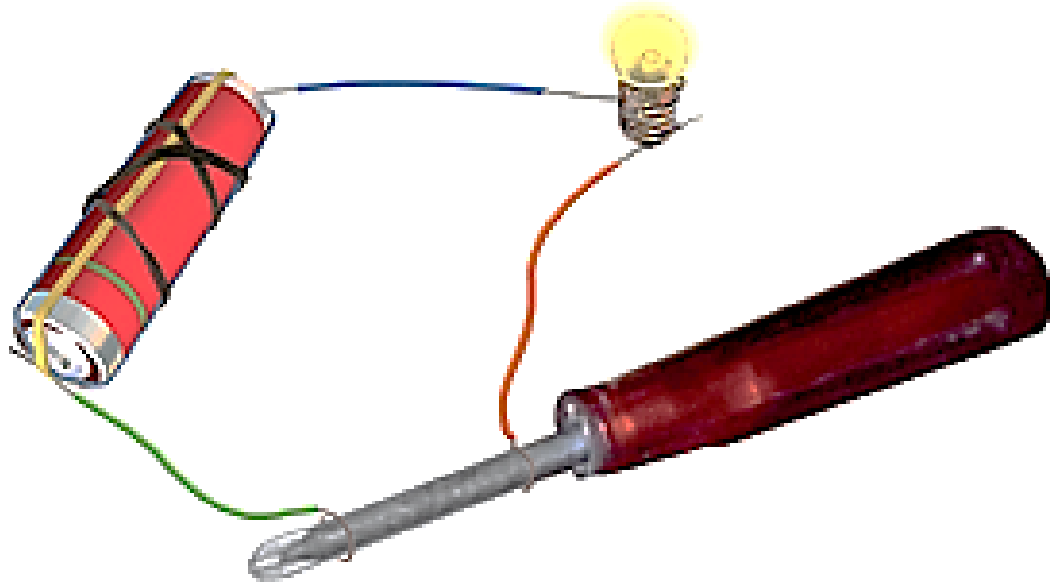

Aluminium

Poor Conductors

Materials, which do not allow electric current to pass through them easily, are poor conductors of electricity.
Example: Plastic, Wood, Rubber etc.

Tester

- To test whether a particular material allows the electric current to pass through it or not.
- we have used our tester to test materials which were in solid state.

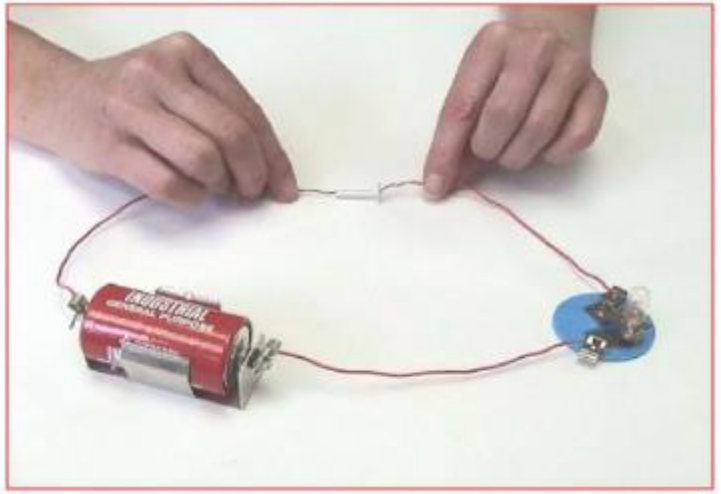


Conduction of Tester using Bulb

Do Liquids Conduct Electricity?

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 good conductor → The bulb glows

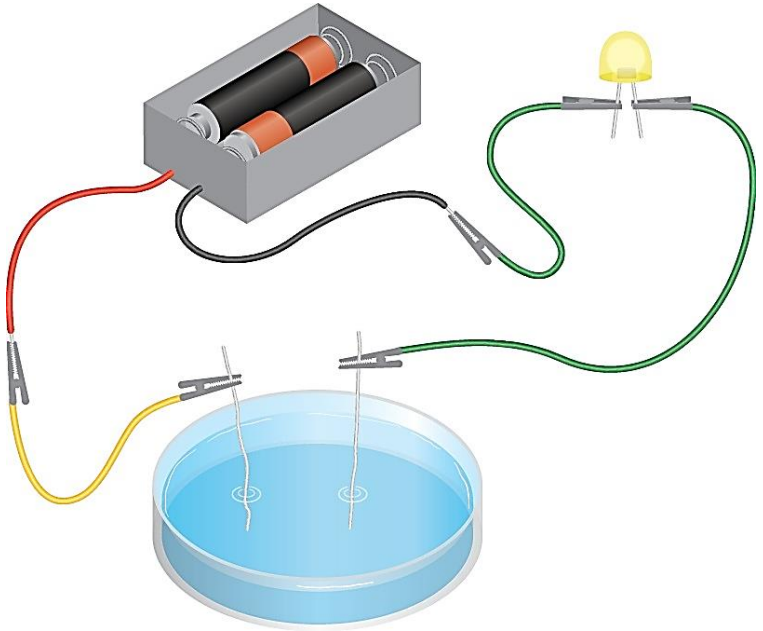
If the material is poor conductor → The bulb does not glow

Conduction of Tester using LED

Do Liquids Conduct Electricity?

Then instead of a torch bulb an LED can be used in the circuit. LED glows even when a weak current flows in the circuit.

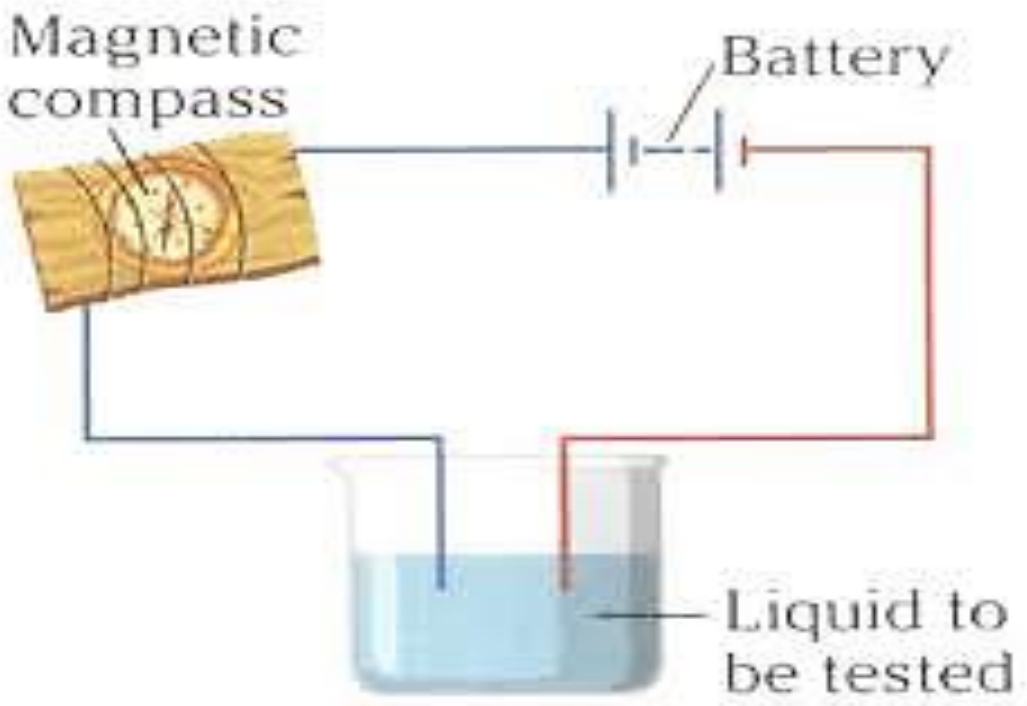
Sometimes the current flowing through the circuit may be too weak and the filament of the bulb may not get sufficiently heated to make it glow.



Conduction of Tester using a Magnetic Compass

Do Liquids Conduct Electricity?

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.



Good / Poor Conducting liquids

Do Liquids Conduct Electricity?

S. No.	Material	Compass needle shows deflection		Good Conductor/ Poor Conductor
		Yes	No	
1.	Lemon juice	Yes		Conductor
2.	Vinegar	Yes		Conductor
3.	Tap water	Yes		Conductor
4.	Vegetable oil		No	Insulator
5.	Milk	Yes		Conductor
6.	Honey		No	Insulator
7.	Kerosene oil		No	Insulator
8.	Distilled water		No	Insulator
9.	Curd water	Yes		Conductor
10.	Soda	Yes		Conductor

Why Does Distilled Water Not Conduct?

Do Liquids Conduct Electricity?

- Distilled water is pure water (H_2O) with no dissolved salts.
- It has very few ions (H^+ and OH^-), so it does not conduct electricity.

But what happens if we add a little salt?

- Common salt (NaCl) dissociates into Na^+ and Cl^- ions.
- These ions carry electric current through the liquid.
- The bulb will now glow!

Electrical Conductivity of liquids

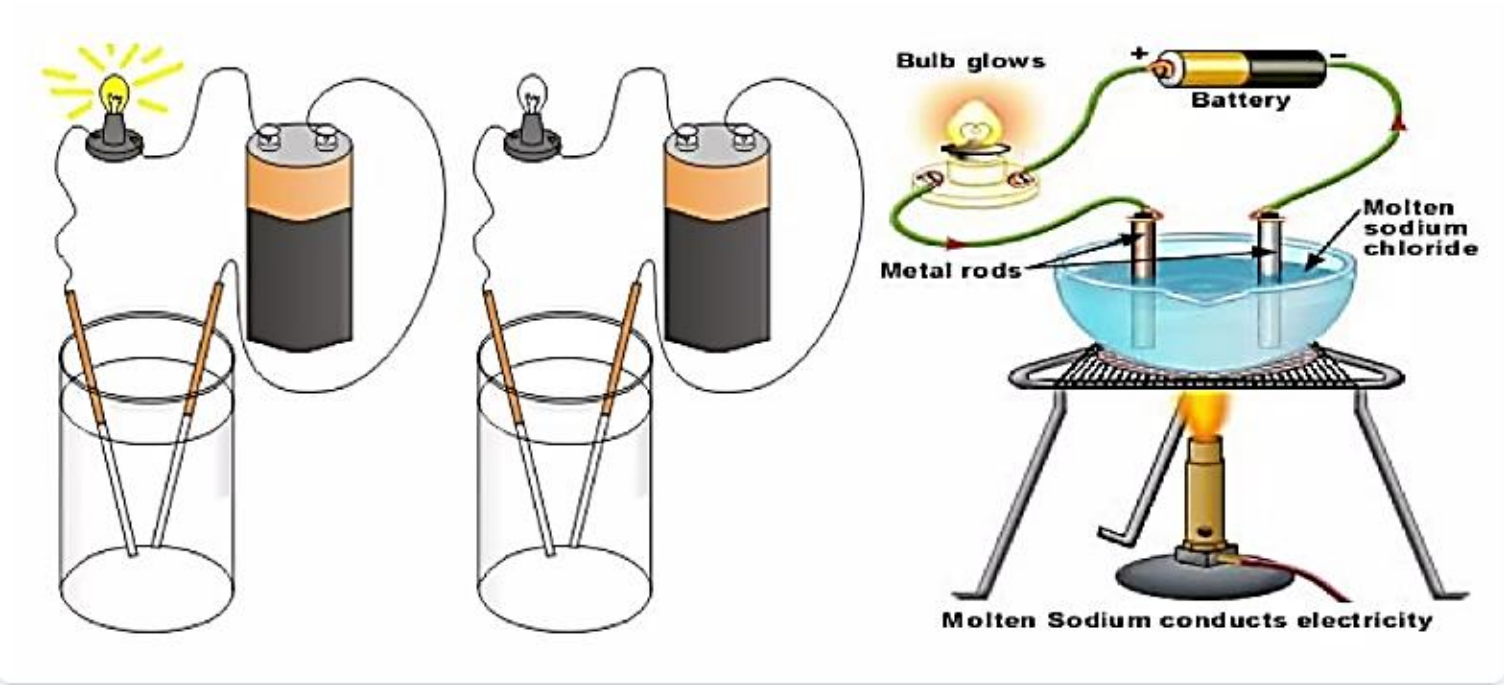
Do Liquids Conduct Electricity?

Some liquids are good conductors of electricity

Example: Tap water, Acid solutions, Basic solutions, salt solutions etc.

Some liquids are poor conductors of electricity.

Example: Distilled water, Sugar solution, Alcohol solution etc.



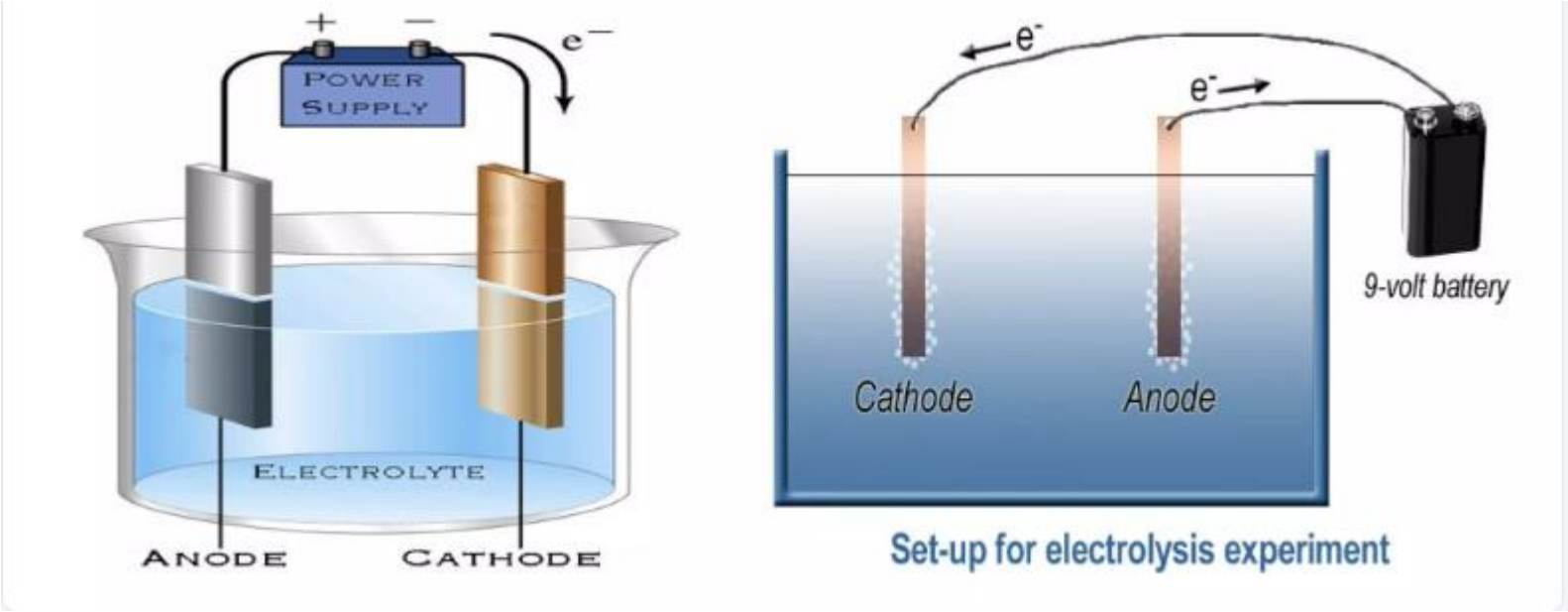
What happens when current passes through a conducting liquid?

Chemical Effects of Electric Current

The passage of an electric current through a conducting liquid causes chemical reactions. The resulting effects are called chemical effects of currents.

Chemical effects of electric current may cause

a) Formation of gas bubbles at the electrodes.
b) Deposit of metals on the electrodes.
c) Change in Colour of the solution.



Chemical Effects of Electric Current

Electrolysis of water

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

When electric current is passed through water,

i) Oxygen gas bubbles are produced at the electrode connected to the positive terminal of the battery.

ii) Hydrogen gas bubbles are produced at the electrode connected to the negative terminal of the battery.

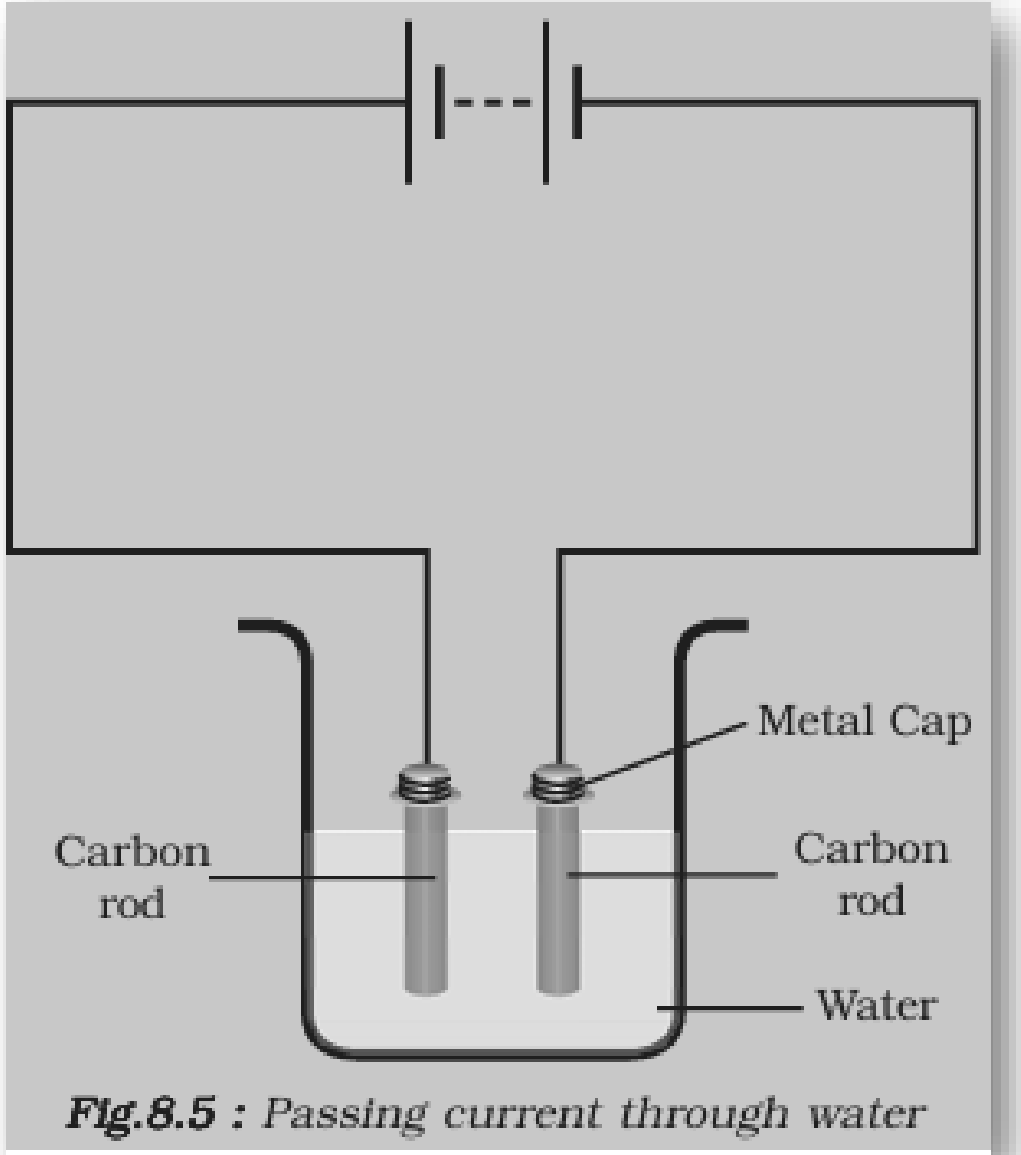
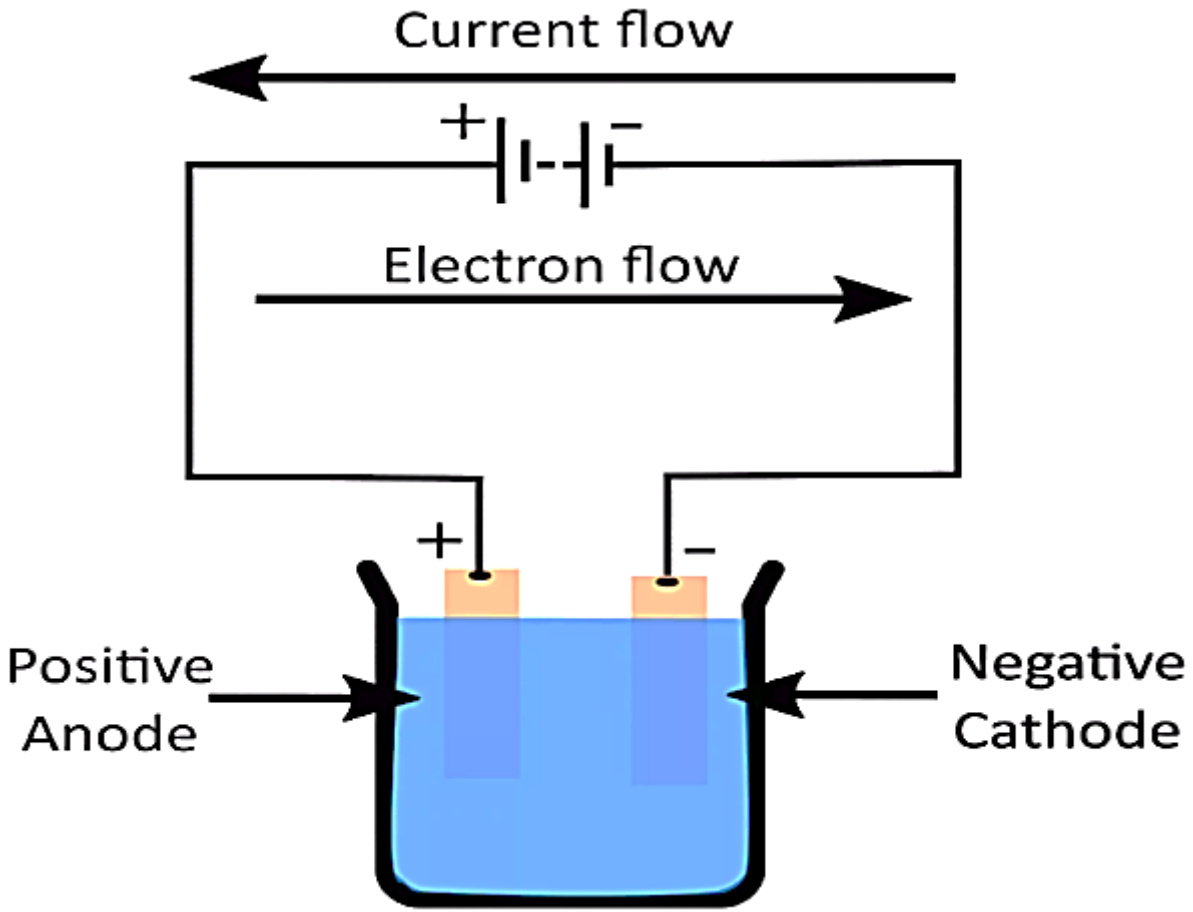


Fig.8.5 : Passing current through water

Electroplating

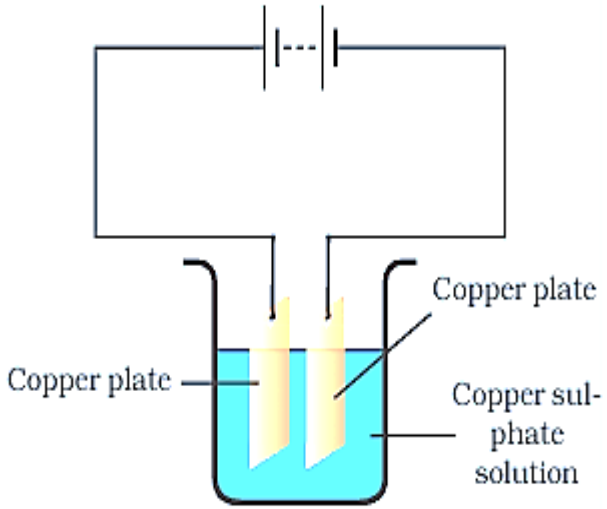
Definition

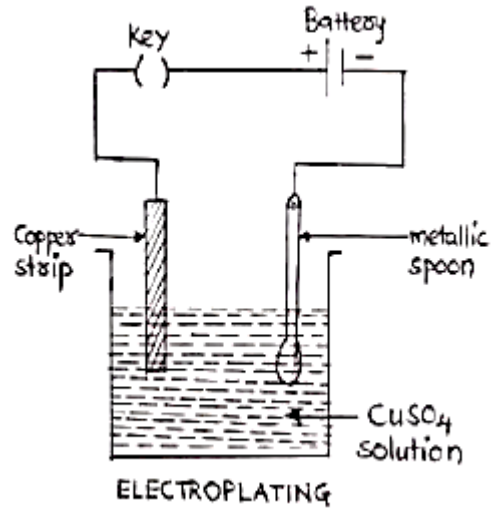
The process of depositing a layer of any de sired metal on another material, by means of electricity, is called electroplating.



Electroplating Process

- When electric current is passed through the copper sulphate solution, copper sulphate dissociates into copper and sulphate.
- The free copper gets drawn to the electrode connected to the negative terminal of the battery and gets deposited on it.
- From the other electrode, a copper plate, an equal amount of copper gets dissolved in the solution.
- Thus, the loss of copper from the solution is restored and the process continues. This means that copper gets transferred from one electrode to the other.





Electroplating Process

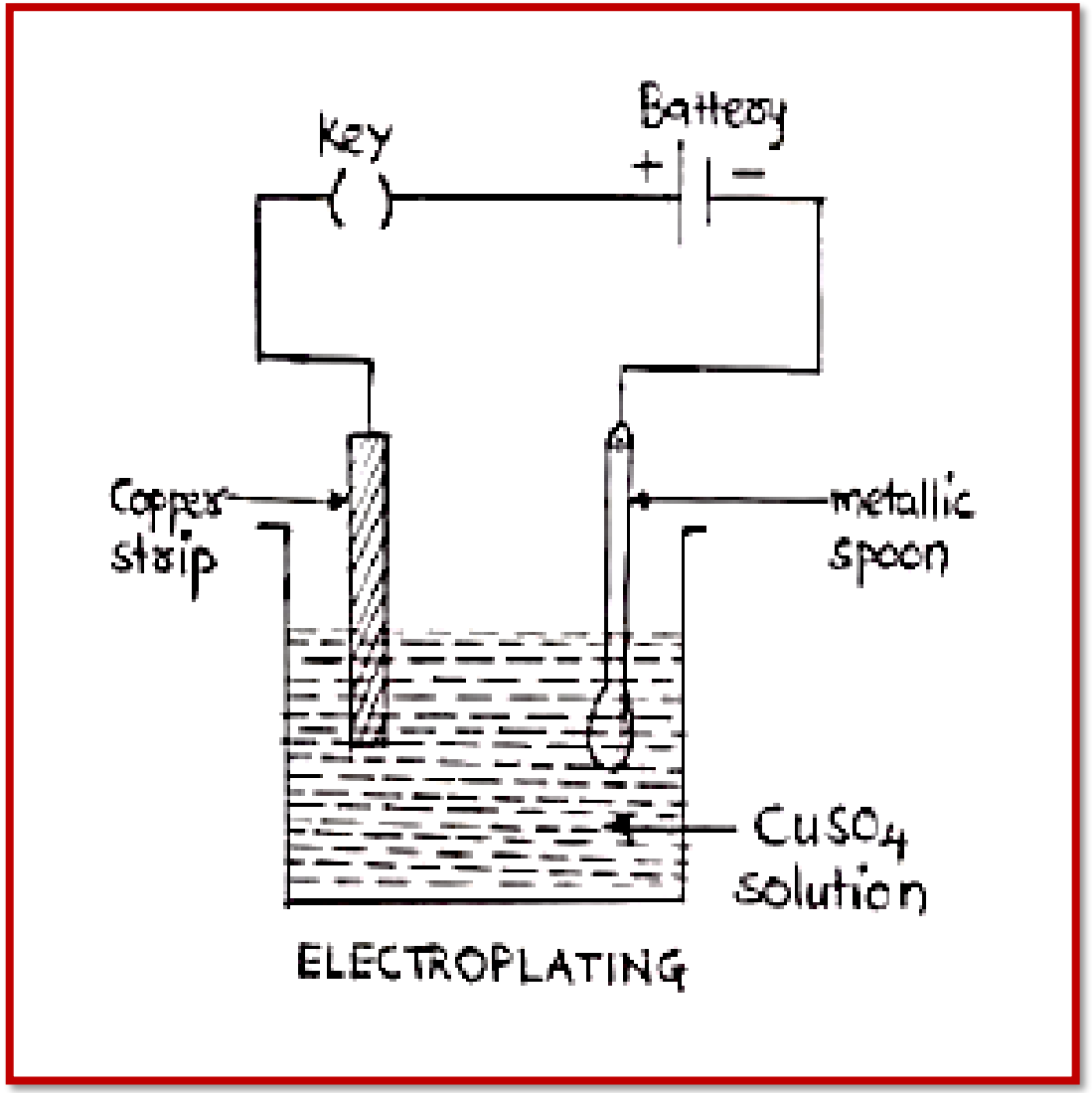
Solution: Salt solution of the metal to be plated (Example: Copper Sulphate for copper plating).

Anode (+ terminal): Made of the pure plating metal (Example: Copper rod).

Cathode (- terminal): The object to be plated (Example: An iron key).

How it works:

1. Current flows.
2. Metal from the anode dissolves into the solution.
3. An equal amount of metal from the solution is deposited on the cathode (the object).
4. The object gets a smooth, shiny coating of the desired metal.



Electroplating

Applications

Chromium Plating

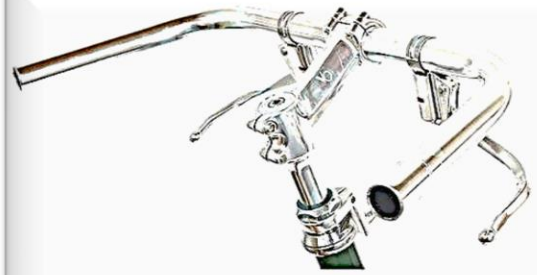
Used on car parts, bicycle handlebars, and bathroom taps to give a shiny, attractive appearance and prevent corrosion. It is also scratch-resistant.

Tap

Kitchen Stove

Car Grill

Wheel Rims



Bicycle handle

Bicycle Bell

Electroplating

Applications

Tin Plating

Used on food storage containers (cans) to prevent food from reacting with the steel of the can.

Electroplating

Applications

Silver and Gold Plating

Used on cutlery, jewellery and decorative items.

Electroplating

Applications

Prevention of Corrosion: (Ex: iron plated with zinc - galvanization)

Shiny Appearance: (Ex: cheap metals plated with gold or silver)

Make objects appear expensive


thank you