

Chemical Effects of Electric Current

Conduction of Electricity

Conductors

- Substances which allow electricity to pass through them are called conductors.
- Examples: Silver, gold, acidic solution, salt solution

Insulators

- Substances which do not allow electric current to pass through them are called insulators.
- Examples: Plastic, rubber, wood

Conduction of Electricity through Liquid

- Liquids which conduct electricity are solutions of acids, bases and salts in water.
- Tap water, acid solutions and salt solutions are good conductors of electricity.
- Distilled water, sugar solution and kerosene are poor conductors of electricity.

Difference in Conduction by Solids and Liquids

Differences in Conduction	
By Solids <ul style="list-style-type: none">• Electricity is carried by electrons.• No chemical change takes place.	By Liquids <p>Electricity is carried by positively and negatively charged ions.</p> <ul style="list-style-type: none">• Chemical change takes place.



To Test whether Liquids Conduct Electricity

- The conduction of electricity through a liquid can be tested by a conduction tester.
- A conduction tester is a device used to determine whether a substance is a good or poor conductor of electricity.
- A substance can be tested using
 - An electric cell and a torch bulb – for relatively strong currents
 - Using a light emitting diode (LED) – for weak currents
 - Magnetic compass – for weak currents

Chemical Effects of Electric Current

- When an electric current is passed through a conducting solution, some chemical reaction occurs.
- Examples:
 - When electric current is passed through water, water dissociates into hydrogen and oxygen. Hydrogen is deposited on the negative pole, and oxygen is deposited on the positive pole. Deposition of hydrogen and oxygen at different poles is visible in the form of bubbles.
 - When an electric current is passed through the solution of a metal salt, such as a solution of copper sulphate, the metal gets deposited at the negative pole because metal is positively charged.
 - Sometimes, the color of a solution also changes when an electric current passes through it.
- In the above examples, the chemical reaction depends on the nature of the conducting solution and on the nature of electrodes used for the passage of electric current.

Electroplating

- Electroplating is an application of the chemical effect of electric current.
- It is the process of depositing a thin layer of any desired metal on another material by electricity.
- It is done to make the metals shiny.





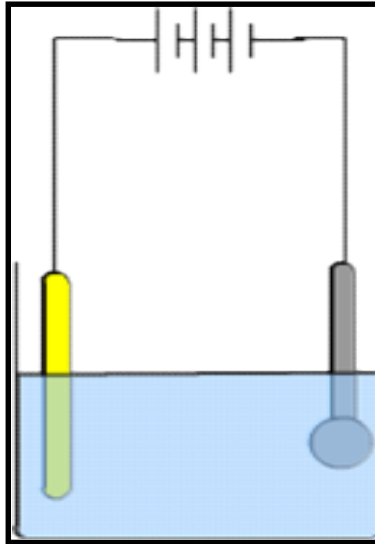
- Articles made of iron are electroplated to make them shine and to prevent iron from rusting.
- **Example:** Chromium plating is done on many objects such as car parts, bath taps, kitchen gas burners, bicycle handlebars and wheel rims.

Benefits of Electroplating

- Electroplating has many benefits in our day-to-day lives.
 - Chromium has a shiny appearance, so it does not corrode and it resists scratches. Because chromium is expensive, it may not be economical to make the whole object of chromium. Therefore, the object is made of a cheaper metal and only a coating of chromium is deposited over it.
 - Jewellers electroplate silver and gold on less expensive metals.
 - Tin cans used for storing food are made of iron electroplated with a coat of tin. Tin is less reactive than iron and prevents food packed in them from getting spoilt.
 - Iron is used in bridges and automobiles to provide strength. However, iron tends to corrode and rust. So, a coating of zinc is deposited on iron to protect it from corrosion and formation of rust.
 - Water pipes, which are made of iron, are coated with a layer of zinc metal by the process of electroplating.

Process of Electroplating

- In the process of electroplating, a metal salt solution is taken in a container.



- The metal to be coated is dipped in the solution and connected to the negative pole.
- The metal for desired coating is connected to the positive pole.
- When an electric current is passed through the solution, the metal from the anode is dissolved in the salt solution and deposited over the cathode.
- Thus, a coating of the desired metal is obtained on another metal.