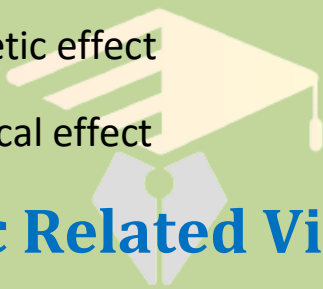




Effect of Current | Heating Effect, Magnetic Effect, Chemical Effect

The presence of [electric current](#) can be detected by the various effect of current that it produces e.g.

1. Heating effect
2. Magnetic effect
3. Chemical effect



Topic Related Video:

[Effects of Current - Current Electricity](#)

HEATING EFFECT:

Current flows through a metallic wire due to the motion of free electrons. These electrons collide with the atoms of the metal and give some of their kinetic energy to these atoms.

As a result, it increases the kinetic energy of the vibrations of the atoms of the metal, ie, it generates heat in the wire. The heat 'H' produced by a current in the wire of resistance 'R' during the time 'T' is

$$\text{Energy} = q\Delta v = (it) (IR)$$

$$H = I^2Rt$$

Uses of heating effect

- Electric heater
- Electric Kettles
- Toaster
- Electric iron etc.



Magnetic Effect:

When current flows in a straight wire, coil, or solenoid, a magnetic field is produced around them.

The strength of the field depends on the value of current and distance from the wire.

Uses of magnetic effect:

The magnetic effect is used in galvanometers to detect the current. Motors, fans, drill machines, grinders, etc use this effect.



Chemical Effect:

Certain liquids like dilute H_2SO_4 , and CuSO_4 , in solution conduct electricity due to some chemical reactions that take place within them. ***This process is called Electrolysis***

The chemical changes produced during the electrolysis of a liquid are due to the chemical effects of the current.

It depends upon the nature of the liquid and the quantity of electricity passed through it.

Different terms used in the electrolysis are

Electrolyte:

The liquid which conducts electric current is called an electrolyte.

Electrode:

The material in form of wire, rod, or plate at which electric current enters or leaves the electrolyte is called the electrode

Anode:

The electrode connected with the positive terminal of the battery is called Anode.

Cathode:

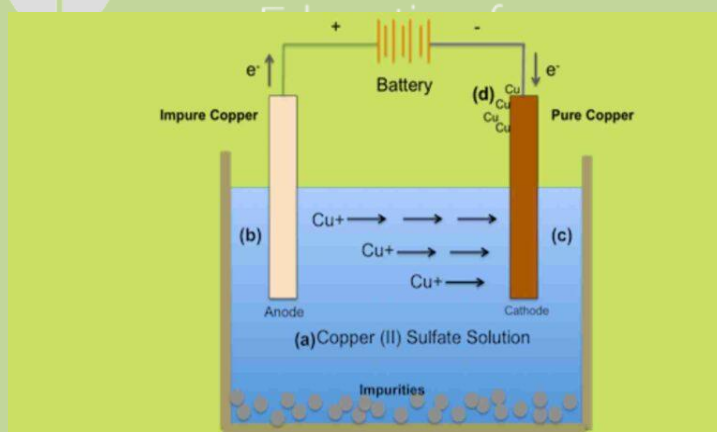
The electrode connected with the negative terminal of the battery is called Cathode

Voltameter

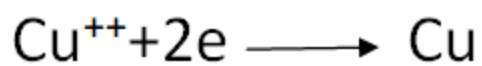
The vessel containing the two electrodes and the liquid is called Voltameter

Working of voltameter

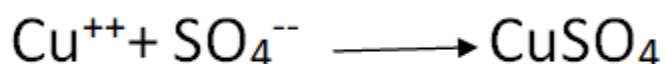
Consider CuSO_4 solution in a voltameter whose both electrodes are made of Cu.



Cu^{++} and SO_4^{-} are present in the solution. When current passes through the solution, Cu^{++} ions move towards the cathode and the following reaction takes place at the cathode



The Cu atoms thus formed are deposited on the cathode. The SO_4^- ions move towards the anode, take two Cu^{++} from it and form CuSO_4 , Following reaction takes place at the anode



As the process of electrolysis continues, copper is deposited on the cathode. At the same time, an equal amount of copper is dissolved into the solution from the anode keeping the density of the CuSO_4 solution constant.

Use of chemical effect

Electroplating:

The process in which a thin layer of an expensive metal (gold, silver) is deposited on a cheap metal(iron) is called electroplating.

