KITE VICTERS ONLINE CLASS - 27-10-2020

Chemistry- X- Unit -3. Class - 19

Reactivity series and electrochemistry

Electrolysis of sodium chloride solution

Sodium chloride solution contains ions like Na^+, Cl^-, H_3O^+, OH^- , H_2O

Anode

Cl^- ions and OH^- ions are attracted towards anode.

When compared to these ions and water, the tendency to get oxidised is greater for chloride (Cl^-) ions.

Hence Chlorine gas is liberated at anode.

$$2Cl^- \rightarrow Cl_2 + 2e^-$$

Cathode

Na^+ ions and H_3O^+ ions are attracted towards cathode. As H_2O has a greater tendency to get reduced, compared to these ions, hydrogen gas is liberated at the cathode.

$$2H_2O + 2e^- \rightarrow H_2 + 2OH^-$$

NaOH is obtained in the solution

Practical utility of electrolysis

1. Production of metals

Metals like potassium, calcium, sodium and aluminium are produced by the electrolysis of their compounds.

2. Production of non-metals

Electrolysis can be utilised for the production of some non metals such as Hydrogen, oxygen, chlorine etc.

3. Production of compounds

Electrolysis can be employed to produce compounds like sodium hydroxide, potassium hydroxide etc.

4. Refining of Metals

Metals such as copper, gold etc. are refined by electrolysis.

Electroplating

The process of obtaining a coating of one metal over another metal using electrolysis is known as electro plating

Uses

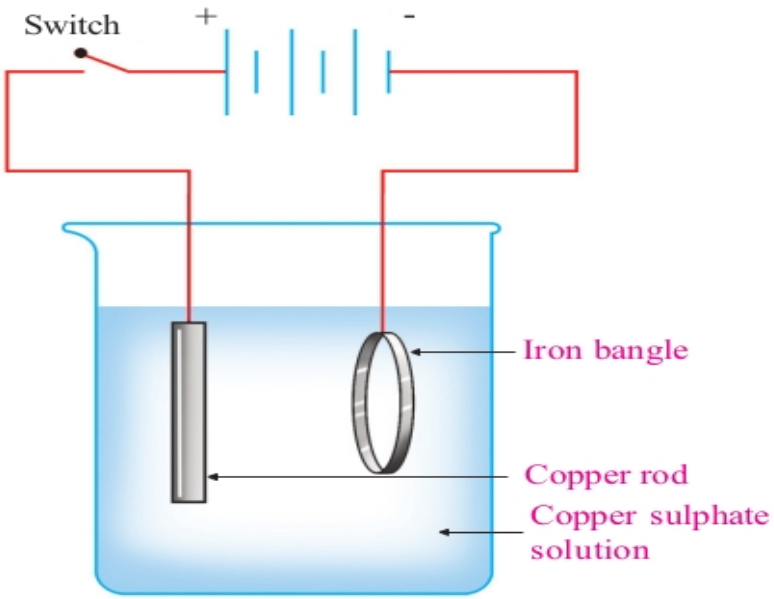
* Improves the appearance of the metal

* Prevents metallic corrosion.

The metal to be coated is connected to the negative terminal (Cathode) of the battery and the metal to be plated is connected to the positive terminal (Anode) of the battery.

A salt solution of the metal to be coated is taken as the electrolyte.

Eg : Electroplating copper on an iron bangle



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Iron bangle is connected to the negative terminal of the battery and Copper rod is connected to the positive terminal of the battery .

Copper sulphate solution is used as the electrolyte.

Cathode

$$Cu^{2+} + 2e^- \rightarrow Cu$$

Anode

$$Cu \rightarrow Cu^{2+} + 2e^-$$

Examples : Gold plated jewellery. Chromium plated handle bars. Silver plated utensils.

Questions

1). Consider the electrolysis of sodium chloride solution.

a) Write down the reactions taking place at cathode and anode.

b) Name the gases liberated from Anode and cathode.

2. Name the electrolyte which is used in electroplating gold on an iron bangle.

3). Give some of the examples for electroplating ,from the day today life .

4).Draw the pictorial representation of electroplating of copper on an iron bangle . Mention important parts such as Anode , Cathode and Electrolyte.

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