

SCIENCE

APPLICATION OF ELECTROLYSIS

Application of Electrolysis:

The principle of electrolysis is employed in the following processes :

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| 1. Manufacture of industrial chemicals | 2. Extraction of metals |
| 3. Refining of metals | 4. Electroplating |

1. **Manufacture of Industrial Chemicals**

Many chemicals which are used in industry in large quantities are prepared by electrolytic method.

Some of these are :

- (i) Sodium hydroxide, NaOH (caustic soda) and Chlorine gas, $\text{Cl}_2(\text{g})$ are prepared by the electrolysis of brine (20% common salt solution).
- (ii) Hydrogen gas, $\text{H}_2(\text{g})$ is prepared by the electrolysis of acidified water, or 20% NaOH solution. Oxygen is obtained as by-product.

2. **Extraction of Metals–Electrometallurgy**

More electropositive metals, such as sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), aluminium (Al), etc. cannot be obtained by carbon reduction process. These metals can be obtained by the electrolysis of their molten chlorides, hydroxides or oxides.

For example,

- 1. Sodium and potassium are obtained by the electrolysis of their molten chlorides and hydroxides.
- 2. Calcium and magnesium are obtained by the electrolysis of their molten chlorides.
- 3. Aluminium is obtained by the electrolysis of its molten oxide (in the presence of some other compounds).

3. **Refining of Metals**

The metals obtained by chemical reduction methods generally contain many impurities. Such metals can be refined very easily by electrolytic method. The method of purifying metals by

using electricity is called electrorefining. Metals, such as zinc, copper, silver, nickel, gold, aluminium, etc are refined by electrical method.

4. **Electroplating**

The process of depositing a thin layer of any superior metal over an object of a cheaper metal, with the help of electric current is called electroplating.

For example, deposition of silver on brass or copper objects and that of copper, nickel, chromium etc., on objects made of iron is done by electroplating.

Electroplating is done with the following purpose/objectives.

1. For decoration purposes : Silver or gold plating of brassware such as flower vase.
2. For preventing corrosion : Iron objects, such as, bathroom fittings etc., are electroplated with chromium.