19CH101– ENGINEERING CHEMISTRY

Unit-2 CORROSION AND ITS CONTROL

CATHODIC PROTECTION

The method of protecting the base metal by forcibly making it to behave like a cathode there by corrosion does not occur is called as cathodic protection

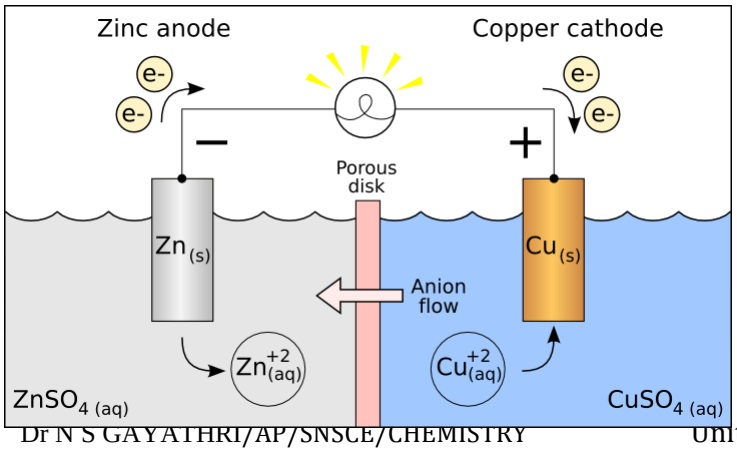
There are two types of cathodic protection

(a) Sacrificial anodic protection
(b) Impressed current cathodic protection

Sacrificial anodic protection

- In this protection method, the metallic structure to be protected (base metal) is connected by a conducting wire to a more anodic metal so that all the corrosion is concentrated at this more anodic metal.
- The more anodic metal itself gets corroded slowly, while the parent structure (cathodic) is protected. The more active metal so employed is called sacrificial anode. The corroded sacrificial anode is replaced by a fresh one, when consumed completely.
- The artificially made anode thus gets corroded gradually protecting the original metallic structure. Hence the process is known as sacrificial anodic protection.
- Metals commonly employed as sacrificial anode are Mg, Zn, Al and their alloys which possess low reduction potential and occupies higher end in electrochemical series.

Eg: A ship-hull which is made up of steel is connected to sacrificial anode (Zn-blocks) which undergoes corrosion leaving the base metal protected.



Applications of Sacrificial anodic protection:

By referring to the electrochemical series, the metal with low reduction potential is connected to the base metal which acts as anode.

1. To protect underground pipelines- Buried pipe line protected by connecting to Mg block
2. Protection of ship hulls and other marine devices.
3. Protection of water tank- by suspending Zn or Mg rods, body of the tank made cathode and protected.

Advantages:

1. It is a simple method.
2. It does not require external power.
3. It has low maintenance and installation cost
4. Cathodic interferences are minimum.

Disadvantages:

1. More than one anode is required some times.
2. It does not work properly in high corrosive environment.
3. Sacrificial anode must be replaced periodically as and when it is consumed