



19CH101– ENGINEERING CHEMISTRY

Unit-2 CORROSION AND ITS CONTROL

Electroless Nickel plating

Electroless Nickel plating involves the following features:

Pretreatment and activation of the surface

The surface to be plated is first degreased (by using organic solvents or alkali), followed by acid-treatment.

- a) Metals and alloys like Al, Cu, Fe, brass, etc. be directly nickel plated without any activation.
- b) Stainless steel surface is activated by dipping in hot solution of 50% dilute H_2SO_4 .
- c) Activation of Mg alloy surface is carried out by giving a thin coating of Zn and Cu over it.

It is an auto-catalytic chemical technique used to deposit a layer of nickel-phosphorus or nickel-boron alloy on a solid work piece, such as metal or plastic. The process relies on the presence of a reducing agent.

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Composition of Bath:

Coating solution- $NiCl_2$ solution

Reducing agent- Sodium hypophosphite ($NaH_2PO_2 \cdot H_2O$)

Buffer- Sodium acetate

Complexing agent- Sodium succinate

Optimum PH - 4.5

Optimum temperature – 93F



Advantages of Electroless plating:

1. Electrical energy is not required.
2. Even intricate parts (of irregular shapes) can be plated uniformly
3. There is flexibility in plating volume and thickness.
4. The process can plate recesses and blind holes with stable thickness.
5. Chemical replenishment can be monitored automatically.
6. Bright finishes can be obtained.
7. Plating on articles made of insulators (like plastics) and semiconductors can easily be carried out.
8. Electroless plated Ni objects has better corrosion resistance, deposits are pore free, hard and wear resistant.

Applications:

- 1) They are used in electronic industry for fabricating printed circuits and diodes.
- 2) It is used in domestic as well as automotive fields (eg. jewellery, tops of perfume bottles).
- 3) Its polymers are used in decorative and functional works.
- 4) Its plastic cabinets are used in digital as well as electronic instruments.