

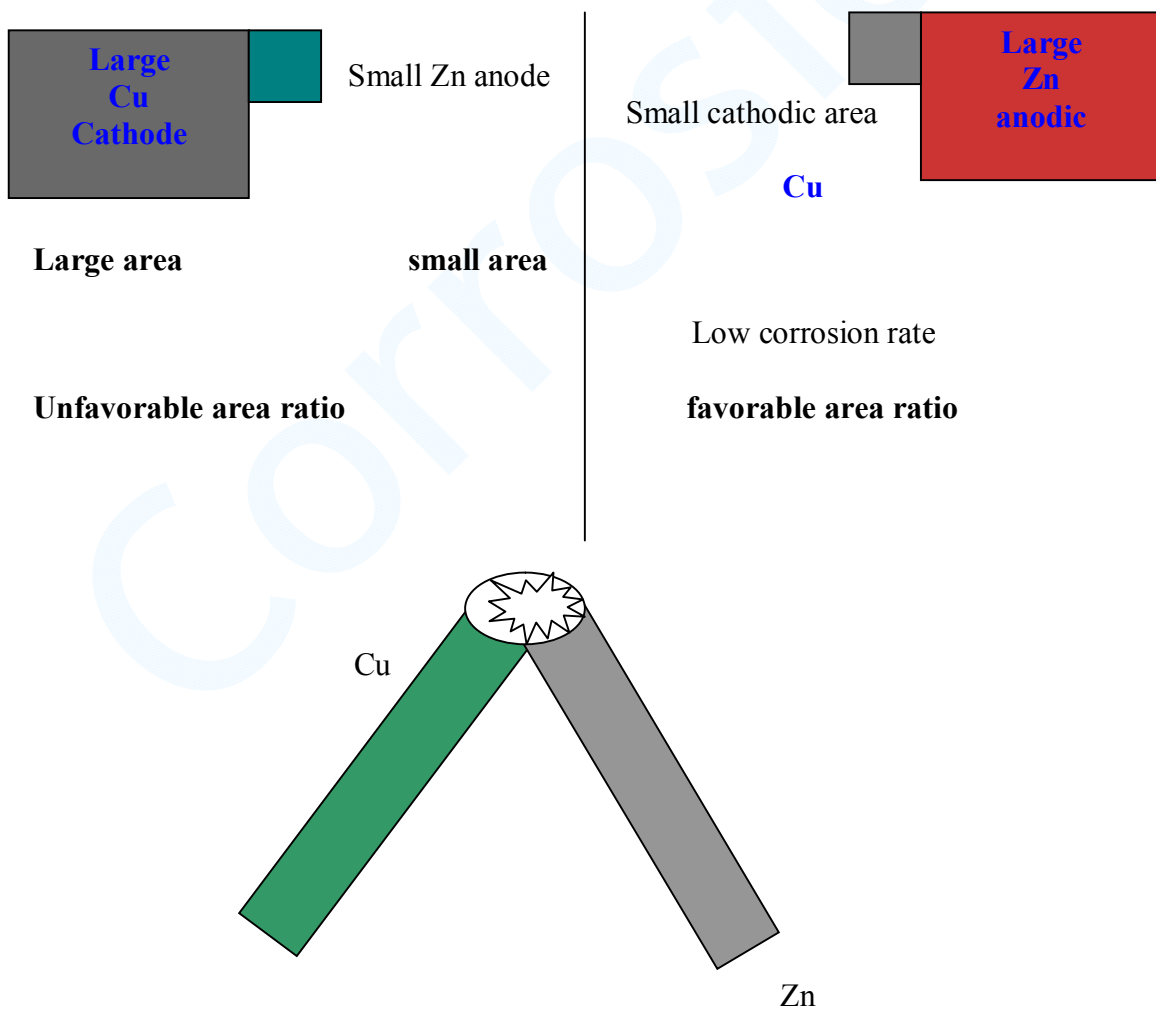
Corrosion

a) Five forms of corrosion are uniform, galvanic, crevice, filiform and erosion corrosion.

Galvanic corrosion (two-metals)

Important factors in galvanic corrosion

- relative areas of anode and cathode
- difference in potential between anode and cathode



Corrosion occur in Zn at the junction

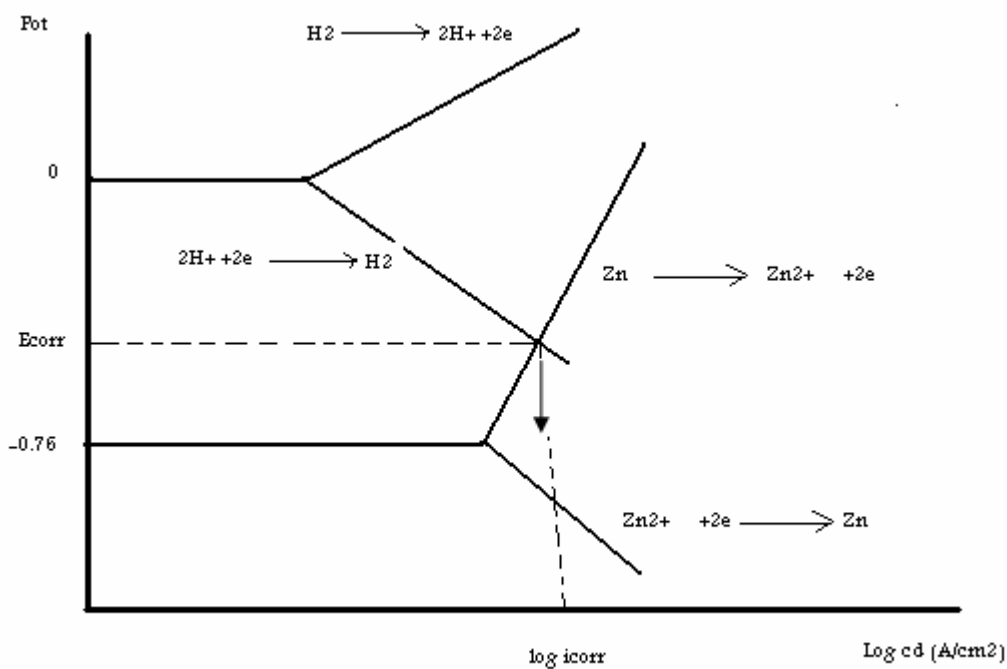
b)

i) mixed potential means poly electrodes

It's the steady state of corrosion

$$\sum \text{Anodic area} = \sum \text{cathodic area}$$

ii)



This is Tafel lines for Zinc in HCl solution.

iii) corrosion rate in (mmd)

$$= i_{\text{corr}} / 2 F \times 65.85 \times 1000 \times 100 \times 60 \times 60 \times 24$$

$$= \text{mg} / \text{dm}^2 \cdot \text{day}$$

C) inhibitor is the substance organic or inorganic used to protect the metal or alloy from corrosion. As chromate, phosphate, hydroxide amino acids,

You take about adsorption inhibitor

Cathodic inhibitor
No effect on anodic

anodic inhibitor
no effect on the cathodic

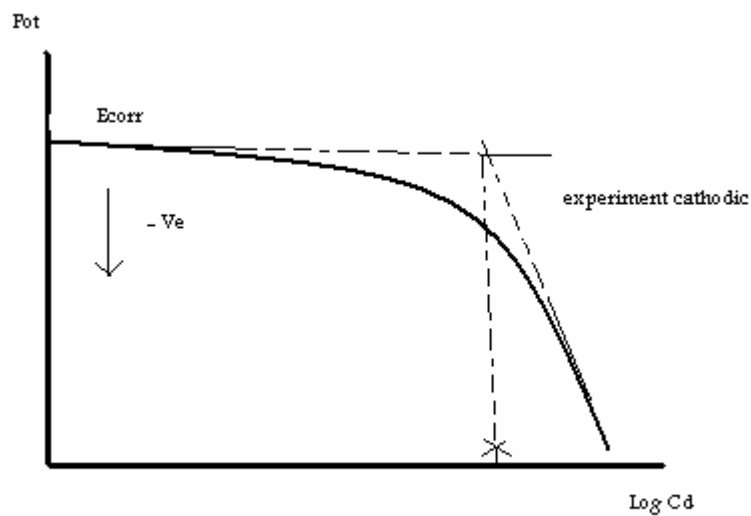
mixed inhibitors

d) Tafel extrapolation method for determination of the corrosion Rate (cathodic polarization)

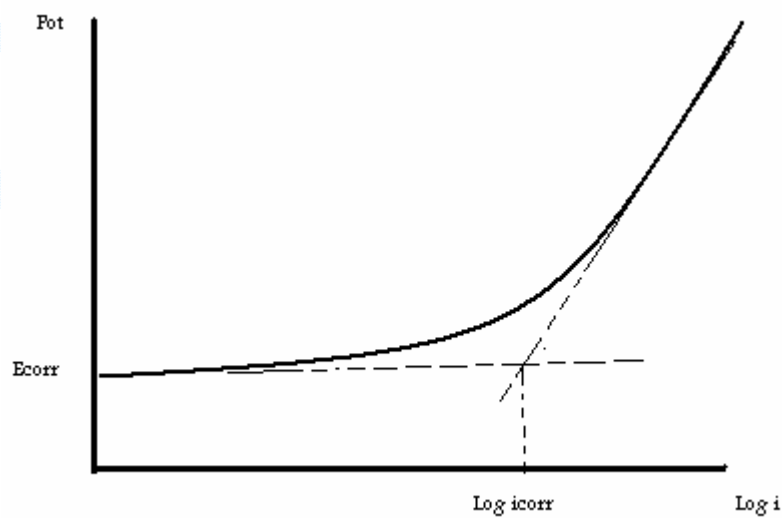
It starts from E_{corr} and goes nonlinearly in the cathodic direction and joins the cathodic lines for reduction of H^+ ion at (X)

E_{corr} is measured from open-circuit with time until steady value of E_{corr}

Cathodic polarization



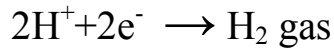
Anodic polarization



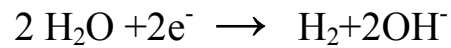
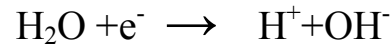
c) Cathodic several possibilities reactions depend on pH and O₂.

In case of No O₂ (no air)

Acid

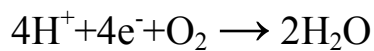
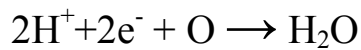


neutral +alkaline



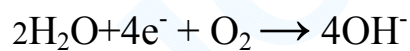
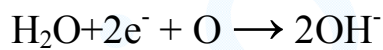
O₂ (or air)

Acid



Water is formed

neutral +alkaline



solution become more alkaline

F) Uses of pourbaix diagram are

1- Knowing the potential and the pH we can determine from the diagram what is the stable species.

2- cathodic protection .

3- Anodic protection.

With my best wishes

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