

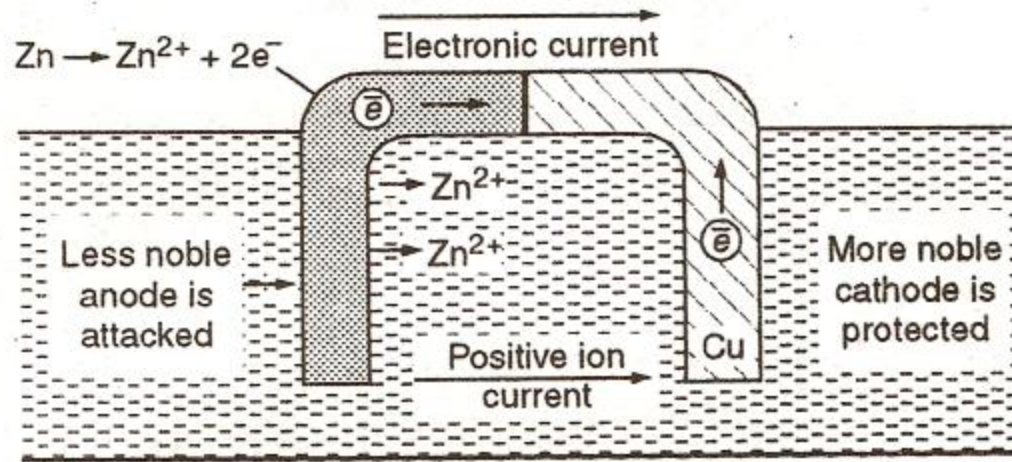
Corrosion

Types of Corrosion:

1. Galvanic corrosion :

It takes place when different metals are jointly exposed to corrosive atmosphere. The metal which is higher up in electrochemical series, with more negative electrode potential will act as anode and undergo corrosion. example, Zn and Cu; Fe and Cu; Zn and Ag. In the Zn-Cu galvanic cell, Zn act as anode where oxidation and corrosion occurs and Cu act as cathode and is protected.

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Galvanic corrosion can be minimised by

- (i) Avoiding galvanic couple.
- (ii) Providing insulating material between the two metals.

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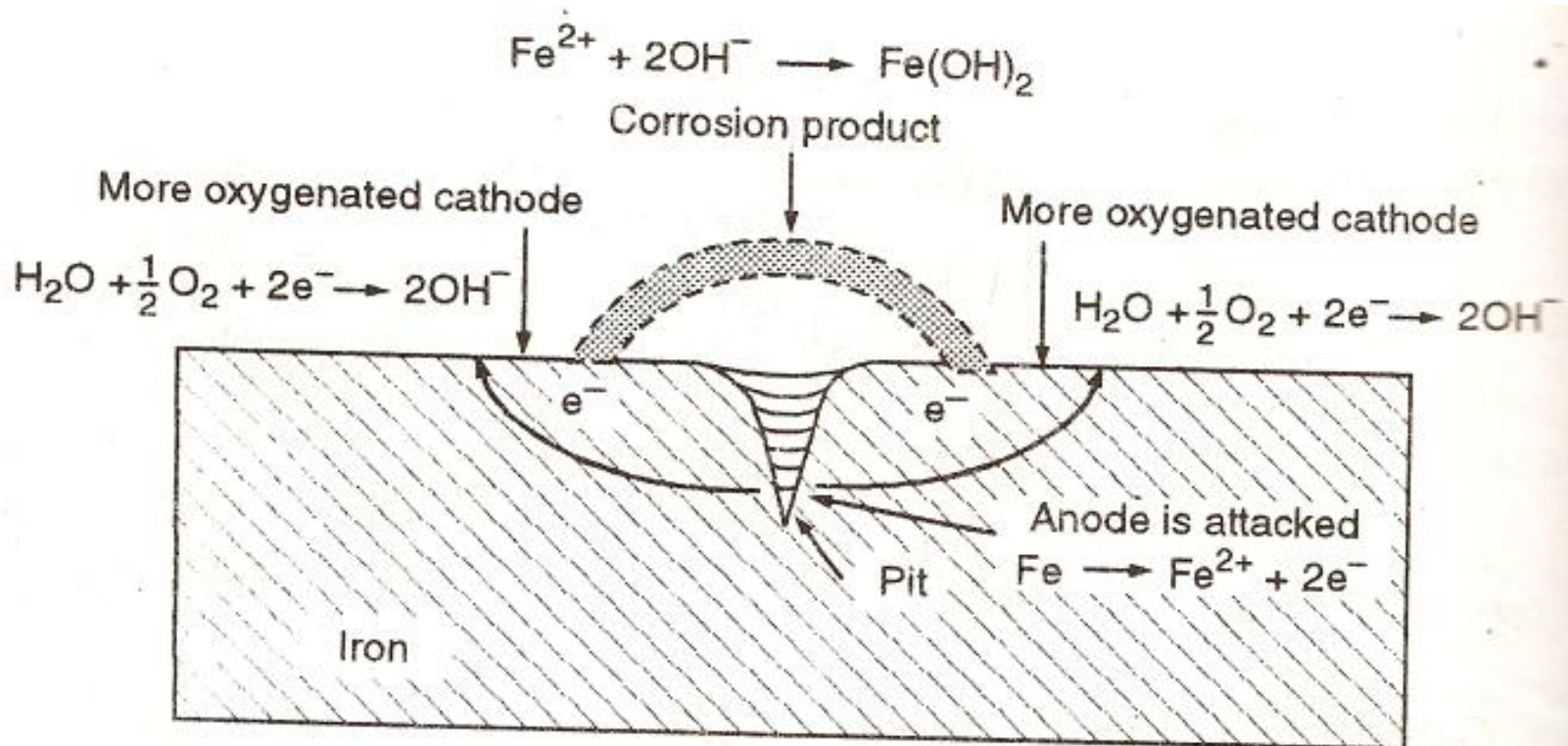
Pitting corrosion :

Pitting corrosion is a localized accelerated attack resulting in the formation of cavities around which the metal is relatively unattacked, therefore, pitting corrosion results in the formation of pinholes, pits and cavities in the metal. Pitting is, usually, the result of the breakdown or cracking of the protective film on the metal at specific points. This gives rise to the formation of small anodic and large cathodic areas.

The presence of extraneous impurities (like sand, dust, scale etc.) embedded on the surface of metals also leads to the pitting. Owing to the differential amount of oxygen in contact with metal, the small part (Underneath the impurity) become the anodic areas and surrounding large parts become the cathodic areas.

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Intense corrosion thus start just undemea impurity. Once a small pit is formed the rate of corrosion will be increased.



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Stress corrosion: Stress corrosion is the combined effect of static tensile stresses and the corrosive environment on the metal stresses that cause cracking result from residual cold working and quenching, welding, thermal treatment or due to applied loads during service. In such cases, the metal under stress becomes more anodic and tend to increase the rate of corrosion.

For stress corrosion to occur presence of tensile stress and specific corrosive environment is necessary. The corrosive agents are highly specific and selective like:

- (i) Caustic alkalis and strong nitrate solution for mild steel. (ii) Traces of ammonia for brass.
- (iii) Acid chloride solution for stainless steel.

This type of corrosion involves in a localized electrochemical corrosion occurring along narrow paths, forming anodic areas with respect to the more cathodic areas at the metal surface. Presence of stress produces strains which result in localized zones of higher electrode potential.

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These become so chemically active that they are attacked, even by a mild corrosive environment, which result in the formation of a crack, which grows and propagates in a plant, until failure occurs or it may stop, after progressing a finite distance.

