



## Introduction

Corrosion is defined as the gradual destruction of metals or alloys by chemical or electrochemical reaction with its environment.

- e.g. Iron undergoes corrosion to form reddish brown colour rust  $[\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}]$ .

“The destruction of a metallic material by chemical, electrochemical or metallurgical interaction between the environment and the material”.

### **CAUSES OF CORROSION**

Metals occur in nature in two different forms.

#### **1. Native state. 2. Combined state.**

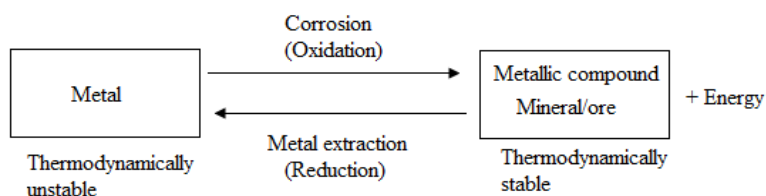
**Native state:** Metals occur in native or free or uncombined state are non reactive with environment. e.g: Au, Pt, & Ag

**Combined state:** Except noble metals all the other metals are reactive and react with the environment and form stable compound

e.g,  $\text{Fe}_2\text{O}_3, \text{ZnO}$  &  $\text{PbS}$

### **Occurance of Corrosion**

- The metals Exist in nature in the form of their minerals or ores, in the stable forms as oxides, chlorides, silicates, carbonates, sulphides etc.
- During the Extraction of metals, these ores are reduced to metallic state by supplying considerable amounts of energy.
- The isolated pure metals are regarded as excited states than their corresponding ores.
- So metals have natural tendency to go back to their combined state (minerals/ores).
- When metal is exposed to atmospheric gases, moisture, liquids etc., the metal surface reacts and forms more thermodynamically stable compounds.



### **Effects of corrosion**

1. Efficiency of the machine is lost due to corrosion products
2. Products get contaminated due to released toxic products
3. Corroded equipment must be replaced frequently



4. Failure of plants
5. Necessary of over designing to compensate corrosion.

### **Theories of corrosion**

Based on the environment, corrosion is classified into

- i) Dry or Chemical corrosion, ii) Wet or Electrochemical corrosion