

7.1 CORROSION

Corrosion can be defined as degradation or deterioration of a metal by chemical or electrochemical reaction with its environment (gaseous or liquid medium).

Degradation or deterioration means reduction in the useful properties of the material which include:

- Weakening of the material due to loss of cross-sectional area.
- Loss of properties such as malleability, ductility.
- Decaying of surfaces of metals.
- Cracking of a polymer due to sunlight.

The materials affected by corrosion are metals, polymers (plastics or rubbers etc.), ceramics (concrete) etc. But metals, the most useful class of materials corrode most frequently and hence this discussion is mainly devoted to corrosion in metals.

Some of the common examples of corrosion in metals are:

Rusting of Iron: When exposed to the atmospheric conditions, a layer of reddish scale and powder of Fe_3O_4 is formed on the surface.

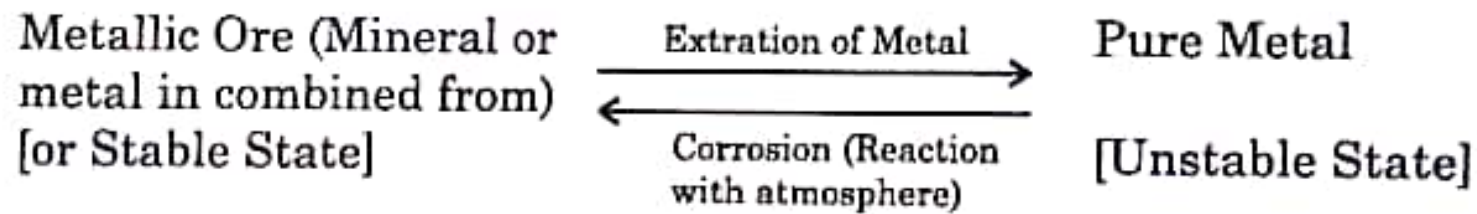
Formation of green film on the surface of copper: A green layer of basic carbonate consisting of $\text{CuCO}_3 + \text{Cu(OH)}_2$ is formed on the surface of copper when exposed to moist air

Tarnishing of silver: When silver is exposed to the atmosphere, a black coating is formed.

2 WHY METALS CORRODE

other words, corrosion process is the return of the refined material to its natural state.

Greater is the amount of energy required to separate the metal from its mineral or ore, greater will be the tendency of the metal to revert back to its natural state resulting in degradation of the metal.



7.4 THEORIES OF CORROSION

A number of different views have been put forward to explain as to how corrosion takes place. Some say, corrosion is oxidation or electrochemical phenomena while others say, it is a chemical attack. Still others have opinion that it is electrical phenomena. Each is partially true. The different theories of corrosions are discussed below.