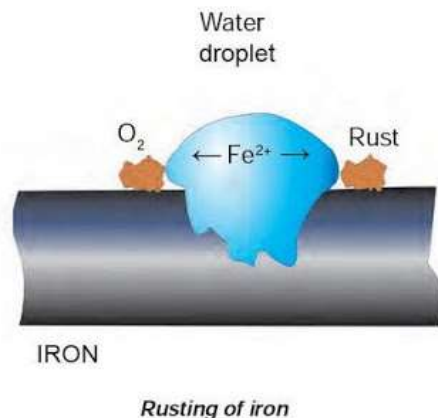


CORROSION- RUSTING -RANCIDITY - OXIDATION



Corrosion is defined as the slow and steady destruction of a metal by the environment.

It results in the deterioration of the metal to form metal compounds by means of chemical reactions with the environment.

Rusting of iron requires air and water. Iron articles are shiny when new, but get coated with a reddish brown powder called rust ($\text{Fe}_2\text{O}_3 \cdot n \text{H}_2\text{O}$) when left for some time. This process is commonly known as rusting of iron.

The black coating on silver and the green coating on copper are other examples of corrosion

SILVER CORROSION

Silver is a very noble metal and is often found in a native state combined with gold, tin, copper, and platinum. It is completely stable in aqueous solutions of any pH as long as oxidizing agents or complexing substances are not present. In addition, silver is not appreciably affected by dry or moist air that is free from ozone, halogens, ammonia, and sulfur compounds

In a marine environment, with its abundance of soluble sulfates and oxygen-consuming, decaying organic matter, sulfate-reducing bacteria utilizes available sulfates under anaerobic conditions to form hydrogen sulfides as a metabolic product. The hydrogen sulfide reacts with the silver to form silver sulfide. The overall reaction proceeds in the same process as described earlier for iron:

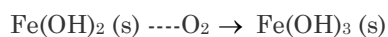
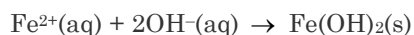
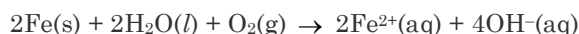
**COPPER CORROSION**

The green coating on copper metal called a patina, the green coating is mainly Copper (II) Carbonate CuCO_3 caused by slow chemical reactions involving the copper metal and water and carbon dioxide.



The chemistry of the reaction resulting in the formation of rust can be summarized as follows.

The chemical equations for rust formation



$\text{Fe}(\text{OH})_3 (\text{s}) \rightarrow \text{dehydrates} \rightarrow \text{Fe}_2\text{O}_3 \cdot n\text{H}_2\text{O} (\text{s})$ or rust

The chemical formula for rust is $\text{Fe}_2\text{O}_3 \cdot n\text{H}_2\text{O}$

Rancidity:

When fats and oils are oxidised, they become rancid and their smell and taste change. Usually substances which prevent oxidation (antioxidants like Nitrogen, B.H.T.) are added to foods containing fats and oil. Keeping food in air tight containers helps to slow down oxidation

Methods of preventing corrosion

Corrosion of metals is prevented by not allowing them to come in contact with moisture, CO_2 and O_2 .

This is achieved by the following methods:

- By coating with paints: Paint coated metal surfaces keep out air and moisture.
- By coating with oil and grease: Application of oil and grease on the surface of iron tools prevents them from moisture and air.
- By alloying with other metals: Alloyed metal is more resistant to corrosion. Example: stainless steel.
- By the process of galvanization: This is a process of coating zinc on iron sheets by using electric current. In this zinc forms a protective layer of zinc carbonate on the surface of iron. This prevents corrosion.
- Electroplating: It is a method of coating one metal with another by passing electric current.
Example: silver plating, nickel plating. This method not only lends protection but also enhances the metallic appearance.
- **Sacrificial protection:**
Magnesium is more reactive than iron. When it is coated on the articles made of steel it sacrifices itself to protect the steel.