

Rusting of iron-

We all must have observed newly bought iron, a silver or copper article appears very shiny but with passage of time they get dull. This is due to the layer of metal oxide that develops on their surface. Rusting of iron, silver jewellery getting tarnished or copper articles getting covered by green layer.

Metals react with atmospheric oxygen and produces metal oxides that are basic in nature because they react with water to form bases.

In case of rusting of iron, the iron reacts with the oxygen present in **air and moisture and develops rust (hydrated iron (III) oxide).**





Fig. Iron chain left in moist air got rusted

Prevention of rusting of iron-

Following methods can be used to prevent corrosion(Rusting):

- Galvanisation -

Method to protect iron articles from rusting by coating them with a thin layer of zinc.



Fig. Galvanised iron used for fencing

- **Alloying-**

Homogeneous mixture of two or more metals, or a metal and a non-metal to change the properties of the pure state metals and protect them from rust.

For instance, Iron is used widely for different purposes but it is never used in pure state. It is due to the fact that pure iron is very soft and stretches in hot state. But mixing with small amount of carbon (about 0.05%) makes it strong and tough. Mixing nickel and chromium with iron gives stainless steel, which is hard and does not rust.



Fig. Stainless steel

Another vital property of alloy is that electrical conductivity and melting point of an alloy is less than that of pure metals. For instance, brass is an alloy of copper and zinc (Cu and Zn), and bronze is an alloy of copper and tin (Cu and Sn), possessing poor conductivity towards electricity. On the other hand copper in pure state is used for making electrical circuits.



Fig. Musical instrument made of Brass (left) and bronze statue (right)

- **Solder is an alloy of lead and tin (Pb and Sn) possessing low melting point and is used for welding electrical wires together.**

Crystallisation: A physical change-

The process of deriving large crystals of pure substances from their solutions is known as crystallisation. It is a physical change. Crystals of salt are obtained by the evaporation of seawater.



Similarly crystals of copper sulphate can be obtained by adding copper sulphate powder to the boiling solution of water and dilute sulphuric acid. This mixture when filtered and allowed to cool produces crystals of copper sulphate.



PLENARY -

Q. Name the metal which is used for galvanising iron.

A. Zinc metal is used for galvanising iron.

Q. Name the metals which are mixed (alloyed) with iron to make stainless steel.

A. Metals like chromium and nickel are mixed (alloyed) with iron to make stainless steel.

ASSESSMENT/EVALUATION -

Q. Suggest two methods to prevent rusting.

A. The two methods to prevent rusting are

- **Painting the iron articles.**
- **Greasing or oiling the iron articles.**

Q. We should eat freshly cut apple. Why?

A. We should eat freshly cut apple because if we leave the apple after cutting, it starts turn to brownish due to the oxidation of the essential nutrients present in it and its food value decreases.

Q. Write word equations for two chemical reactions with the help of materials given here -
Air, copper sulphate, iron, vinegar, iron oxide, carbon dioxide, iron sulphate, copper, lime water, water

A. (i) Iron + air \rightarrow iron oxide

(ii) Copper sulphate + iron \rightarrow iron sulphate + copper