

Class –X

Subject – Science

CHAPTER – 3

METALS AND NON-METALS

CORROSION

When metals keep on reacting with the atmospheric air (air and moisture) for a long time, this leads to conversion of the metal into unwanted, undesirable form. As a result, the metal gets eaten up. This process is called corrosion.

Silver articles become black after some time when exposed to air.

This is because it reacts with sulphur in the air to form a coating of silver sulphide.

Copper reacts with moist carbon dioxide in the air and slowly loses its shiny brown surface and gains a green coat. This green substance is copper carbonate.

Rusting of Iron:

Iron when exposed to moist air for a long time acquires a coating of a brown flaky substance called rust. This phenomenon is called rusting of iron.

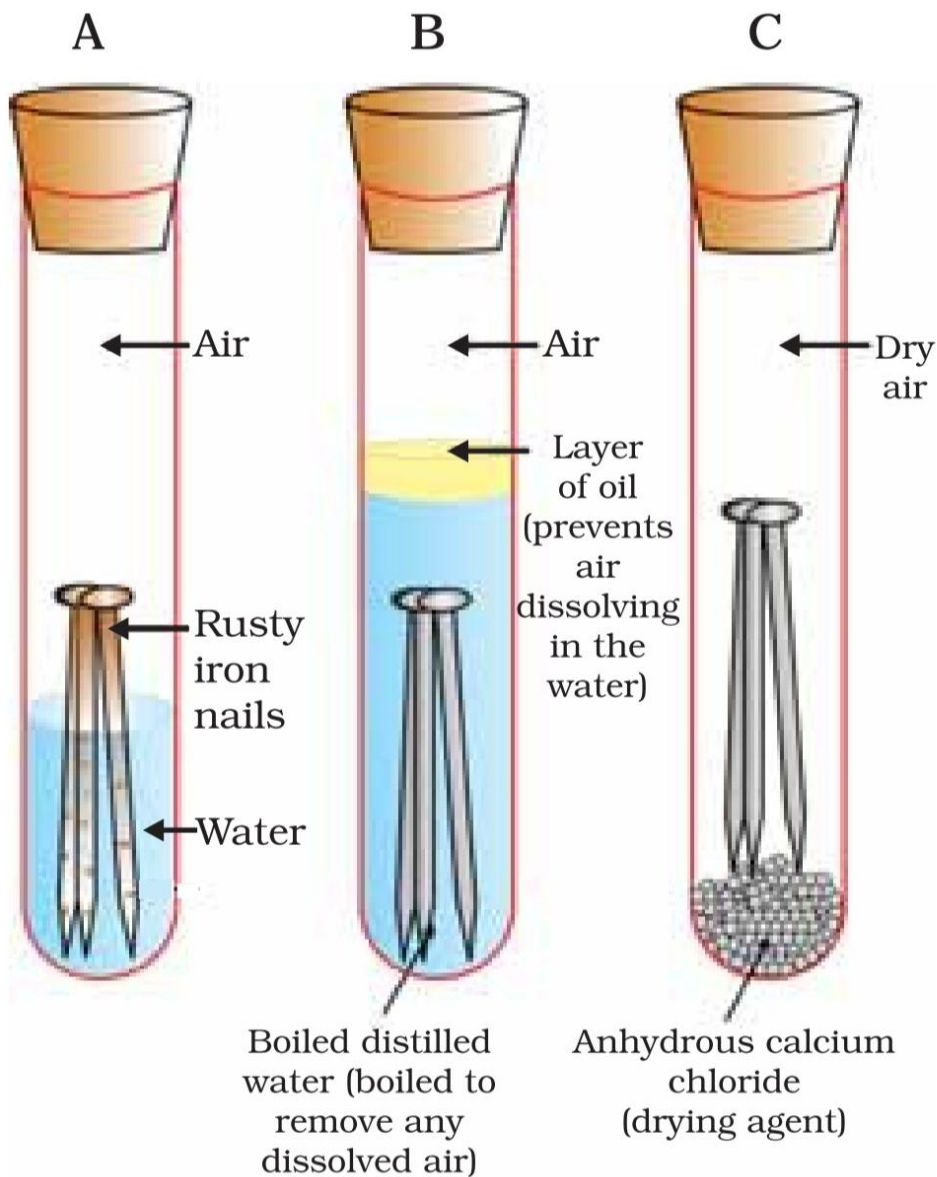


Figure 3.13

Investigating the conditions under which iron rusts. In tube A, both air and water are present. In tube B, there is no air dissolved in the water. In tube C, the air is dry.

Prevention of Rusting: For rusting, iron must come in contact with oxygen and water. Rusting is prevented by preventing the reaction between atmospheric moisture and the iron article. This can be done by painting, greasing, galvanization, electroplating, etc.

METHODS OF PREVENTION OF CORROSION

Some of the important methods of prevention of corrosion are as follows:

a) Painting

This is a common method of preventing iron from rusting. You might have observed that your parents paint Iron Gate in the garden and iron grills in your house. This painting prevents rusting by providing a coating over iron objects.

b) Oiling and greasing

To put a layer of oil and grease on the iron objects also prevents them from rusting. Iron parts of various machines and vehicles are oiled and greased to prevent rusting and to minimize friction.

c) Galvanization

In this method we put a layer of zinc metal on the iron objects and this process is known as galvanization. This method is used on large scale for making galvanized iron sheets for making boxes and for roof covering. Galvanized iron sheets are used to make drums, trunks and other iron containers. Galvanized iron sheets are also used for building roofs and manhole covers. In brief, galvanization prevents rusting in a big way.

d) Alloying

This is a very good method for improving the quality of different metals. In this method a particular metal with other metal or non-metal is mixed in a fixed proportion to improve its quality like resistance towards corrosion, strength, hardness, shining and high tensile strength.

For example, iron metal cannot be used for making utensils because it will rust but when it is mixed with nickel and chromium metal it becomes stainless steel.

Preparation of Alloy -

It is prepared by first melting the primary metal, and then, dissolving the other elements in it in definite proportions. It is then cooled

to room temperature.

Pure gold, known as 24 carat gold, is very soft. It is, therefore, not suitable for making jewellery. It is alloyed with either silver or copper to make it hard. Generally, in India, 22 carat gold is used for making ornaments. It means that 22 parts of pure gold is alloyed with 2 parts of either copper or silver.

Amalgam.

When a metal is alloyed with mercury, it is called amalgam

Sr.No.	Alloy	Composition	Properties	Uses
1	Brass	Copper and Zinc	Malleable, strong, resists, corrosion, can be easily casted.	It is used for making decorative articles, taps, etc.
2	Bronze	Copper and Tin	Very strong and highly resistant.	It is used for making statue and metals.
3	Solder	Lead and Tin	Soft, has low melting point.	It is used for making soldering electronic circuits.
4	Stainless Steel	Fe, C, Cr and Ni	Hard, does not get rusted, malleable.	It is used for making utensils, surgical instruments.
5	Duralium	Al, Mg, Cu, Mn	Light, strong and resistant to corrosion.	It is used for making bodies of aircrafts.
6	Steel	Fe and C	Hard, tough, strong	It is used for construction of ships.

The wonder of ancient Indian metallurgy

The iron pillar near the Qutub Minar in Delhi was built more than 1600 years ago by the iron workers of India. They had developed a process which prevented iron from rusting.