

CHAPTER - 3
METALS AND
NON-METALS

CLASS - X
SUBJECT - SCIENCE

MODULE -6/6

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.

Activity to show that -

air and moisture are necessary for the rusting of iron :-

1) Take three test tubes marked A,B,C and put iron nails in each of them.

2) Put some anhydrous calcium chloride in test tube C to absorb moisture.

3) Pour some boiled distilled water in test tube B and pour some oil over it to prevent air into the test tube.

4) Pour some water in test tube A.

Cork the test tubes and leave them for a few days.

The nails in test tube C does not get rusted because it had only air and no water.

The nails in test tube B does not rust because it had only water and no air.

The nails in test tube A gets rusted because it had air and water.

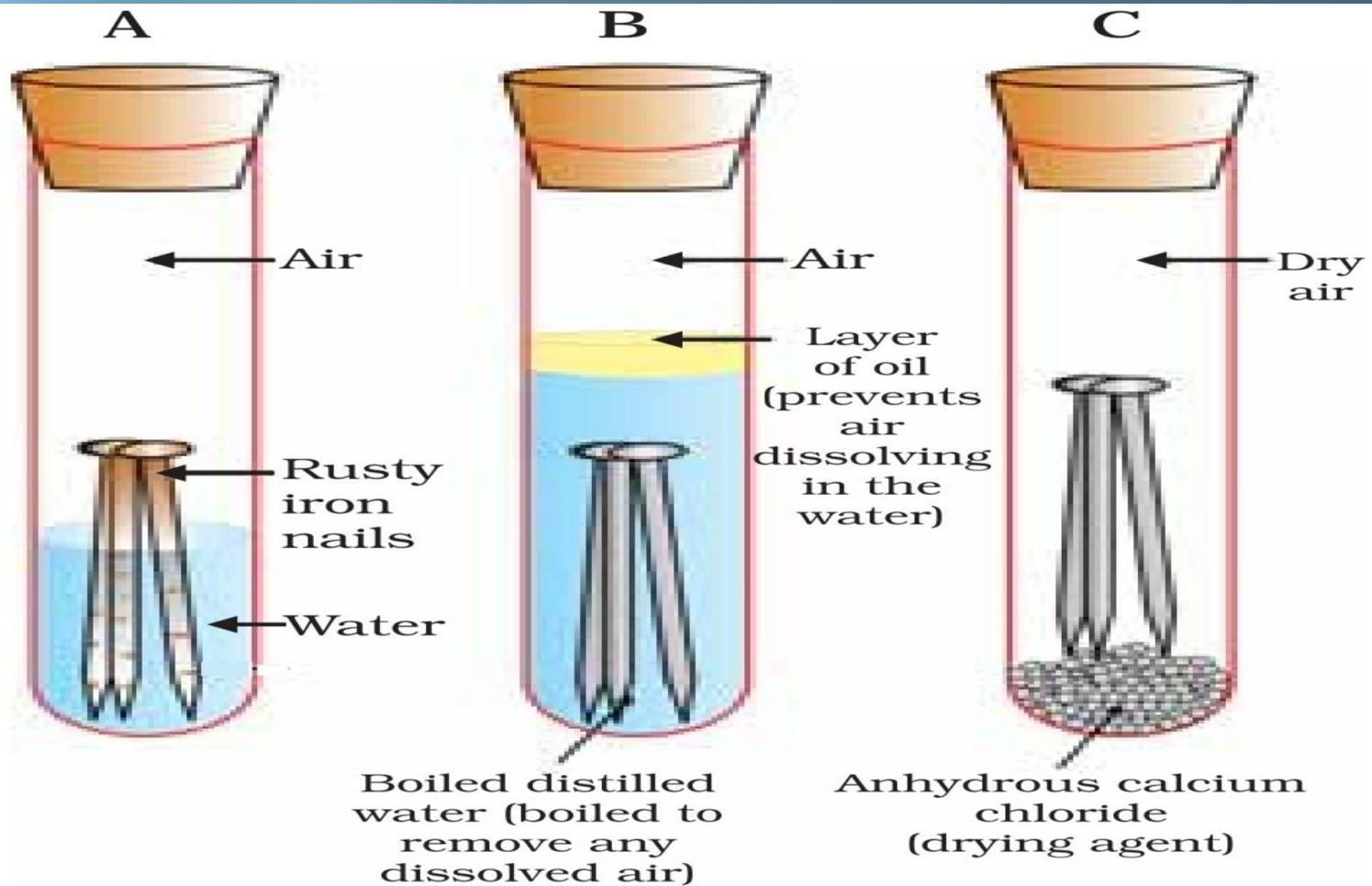


Figure 3.13

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 CORROSION :-

Corrosion of metals can be prevented by :-

- i) Applying oil or grease.
- ii) Applying paint.
- iii) By galvanisation.
(Coating with zinc)
- iv) By tinning.
(Coating with tin)
- v) By electroplating.
(Coating a less reactive metal like chromium)
- vi) By alloying. (Making alloys)

Alloy

An alloy is a homogeneous mixture of a metal with other metals or non metal.

Eg :- **Steel** – iron, carbon

Stainless steel – iron, carbon, cobalt, nickel

Brass – copper, zinc

Bronze – copper, tin

Solder – Lead, tin (used for welding electrical wires together)

- If one of the metals in an alloy is mercury, it is called an **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.

- ▣ **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.

- ▣ **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.

Questions

- ▣ 1) What is Corrosion?
- ▣ 2) Define Alloy. How it is prepared?
- ▣ 3) What is Galvanisation?
- ▣ 4) Why 24 carat gold is not used for making jewelry?
- ▣ 5) Write component of Stainless steel.
- ▣ 6) What is the difference between corrosion and rusting?
- ▣ 7) Write two necessary conditions for corrosion.
- ▣ 8) Silver turn black after few days, Give reason.