

- **Types of Changes**

Changes can broadly be classified into two types – physical and chemical.

- **Physical Change**

Properties such as shape, size, colour and state of a substance are called its physical properties.

A physical change in which a substance undergoes a change in its physical properties is called a physical change.

In physical change no new substance is formed.

Generally a physical change is reversible.

- **Chemical Change**

A change in which one or more new substances are formed is called a chemical change.

A chemical change in which a substance undergoes a change in its chemical properties is called a chemical change.

A chemical change is also called a chemical reaction.

- **Burning of Magnesium Ribbon**

Magnesium ribbon burns with a brilliant white and leaves behind a powdery ash when completely burnt. Magnesium (Mg) + Oxygen (O<sub>2</sub>) → Magnesium oxide (MgO)

**Dissolving magnesium ash in water**

Magnesium oxide (MgO) + Water (H<sub>2</sub>O) → Magnesium hydroxide [Mg(OH)<sub>2</sub>]

- **Difference between Physical and Chemical Change**

Physical Change	Chemical Change
1. The chemical composition of a substance does not change.	1. The chemical composition of a substance changes.
2. Most changes are reversible.	2. Most changes are irreversible.
3. No new substances are formed.	3. One or more new substances are formed.
For example: Ice → Water → Steam	For example, Paper → Ashes

Burning a candle is a combination of physical and chemical change.

## Copper Sulphate Chemical Reaction



When copper sulphate reacts with iron, the colour of the solution changes from blue to green due to the formation of iron sulphate. Copper Sulphate **solution** (blue) + Iron → Iron Sulphate solution (green) + Copper (brown deposit)

## ● Rusting

Rusting is an example of chemical change.

Iron (Fe) + Oxygen (O<sub>2</sub>, from the air) + water (H<sub>2</sub>O) → rust (iron oxide Fe<sub>2</sub>O<sub>3</sub>)

Presence of both air and water is essential for rusting to take place.

Rusting can be prevented by cutting the contact of either air or water or both with iron.



*Rusting iron*

## ● Protection from Rusting

The same can be done by greasing, oiling, painting, and galvanizing iron.

The process of depositing a layer of zinc on iron is called galvanization.

Rusting can also be prevented by alloying iron with other elements. Stainless steel is an alloy of iron

with carbon, chromium, nickel, and manganese.

## ● Crystallization

Crystallization is an example of physical change. The process of crystallization is used for purification of some substances.



**Fig.** copper sulphate solution



**Fig.** copper sulphate crystals