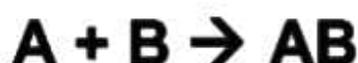
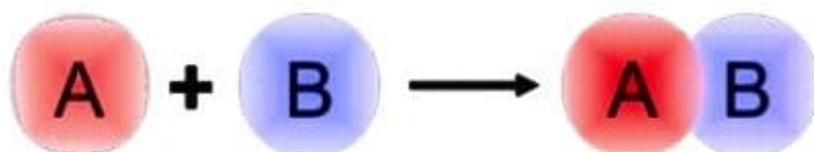


COMBINATION REACTION

A combination reaction is a reaction where two or more elements/compounds(reactants) combine to **form a single compound (product)**.



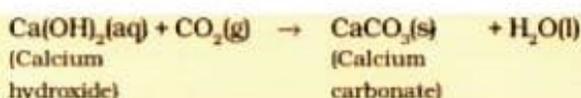
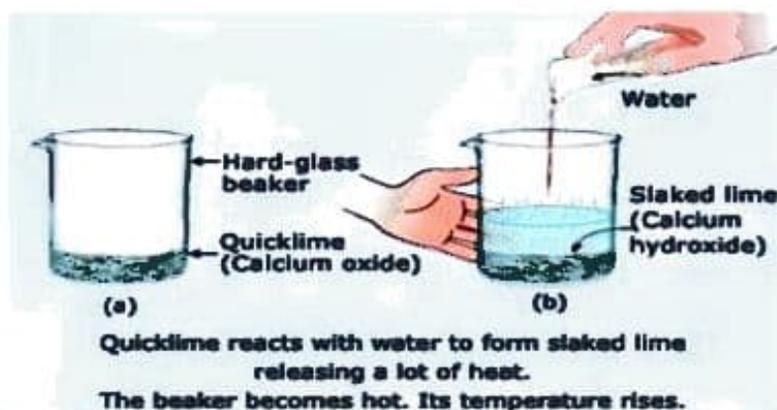
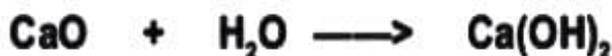
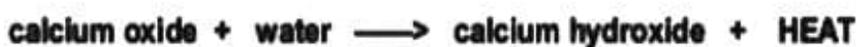
Such a reaction in which a **single product** is formed from two or more reactants is known as a Combination Reaction.

Examples of Combination Reaction

▶ Reaction of Calcium Oxide (quick lime) with Water:

Calcium oxide reacts vigorously with water to produce slaked lime (Calcium hydroxide) releasing a large amount of Heat.

A solution of slaked lime i.e., Ca(OH)_2 produced in the reaction is used for whitewashing walls. Calcium hydroxide reacts slowly with the carbon dioxide in air to form a thin layer of calcium carbonate on the walls. Calcium carbonate is formed after two to three days of whitewashing and gives a shiny finish to the walls.

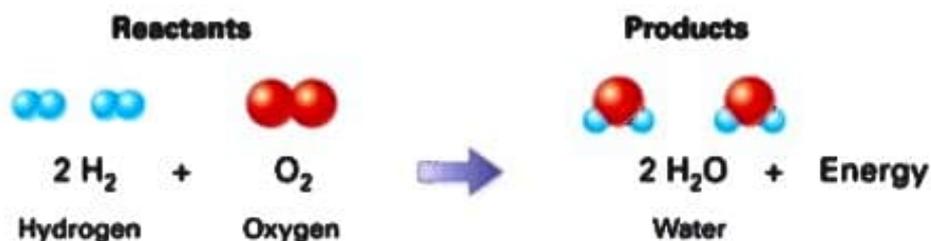


Examples of Combination Reaction

▶ Burning of Coal

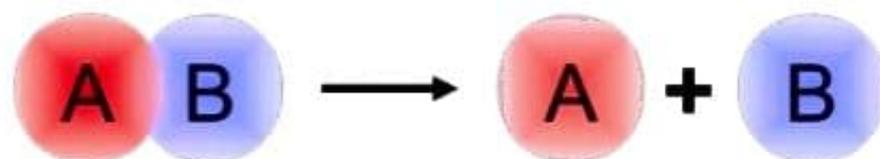


▶ Reaction Between Hydrogen gas and Oxygen gas to form water



Decomposition Reaction

The decomposition reaction is the reaction in which a single reactant breaks down to **form two or more products**. This reaction is opposite to combination reaction(as in combination reaction two or more compounds/elements combine to form a single product while in decomposition reaction one single reactant breaks down to form two or more products)



Types of Decomposition Reaction

On the basis of form of energy required for the reaction, these reaction are of three types:

1. Thermal Decomposition(requires heat/thermal Energy)
2. Electrolysis(requires electrical energy)
3. Photolysis/Photochemical decomposition (requires light energy)

Thermal Decomposition

When a decomposition reaction is carried out by the use of heat/thermal energy, it is called thermal decomposition.

Examples of Thermal Decomposition Reaction

1. Heating of ferrous sulphate crystals

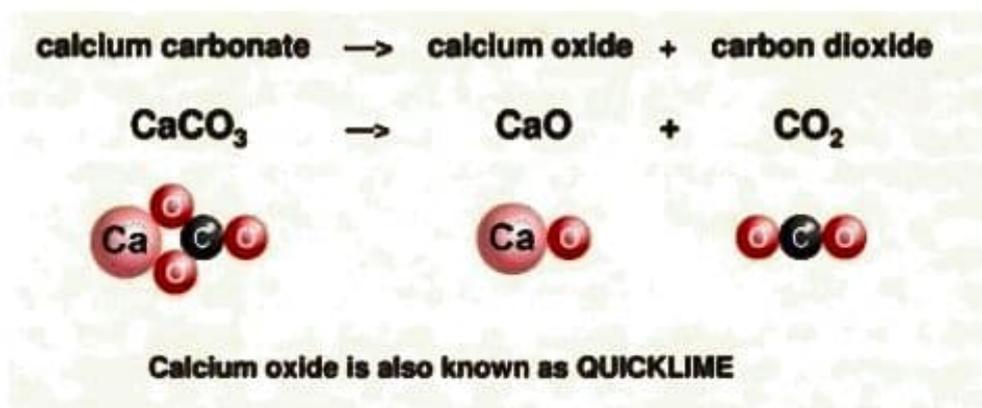
Ferrous sulphate crystals ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) lose water when heated and the colour of the crystals changes. It then decomposes to ferric oxide (Fe_2O_3), sulphur dioxide (SO_2) and sulphur trioxide (SO_3). Ferric oxide is a solid, while SO_2 and SO_3 are gases.



Examples of thermal decomposition Reaction

2. Decomposition of Calcium carbonate

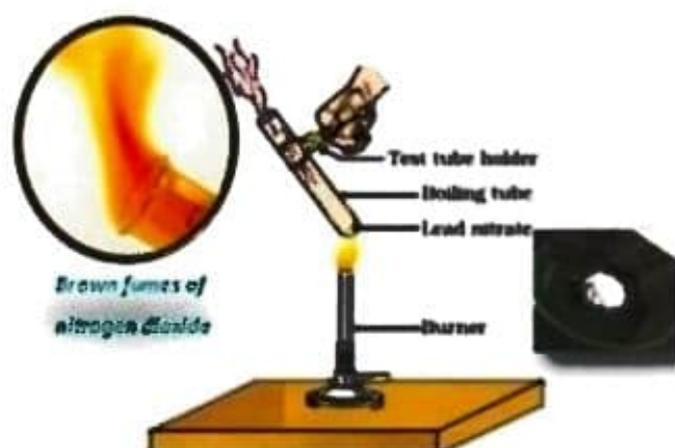
Calcium carbonate decomposes to calcium oxide and carbon dioxide on heating is an important decomposition reaction used in various industries. Calcium oxide is called lime or quick lime. It is used in the manufacture of cement.



Examples of thermal decomposition Reaction

3. Thermal decomposition of lead nitrate

On heating lead nitrate it decomposes to give yellow lead monoxide, Nitrogen dioxide and oxygen gas.



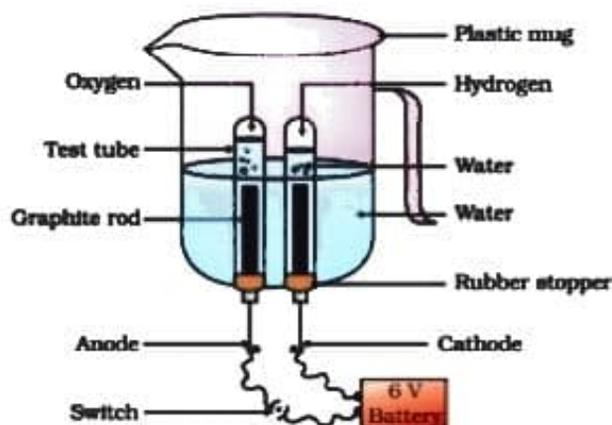
Electrolysis

When a decomposition reaction is carried out by the use of electrical energy, it is called Electrolysis.

Examples of Electrolysis

Electrolysis of water

Electrolysis of water results in the formation of bubbles at both the electrodes. These bubbles displace water in the test tubes. These bubbles are observed due to formation oxygen and hydrogen gas at respective carbon electrodes.



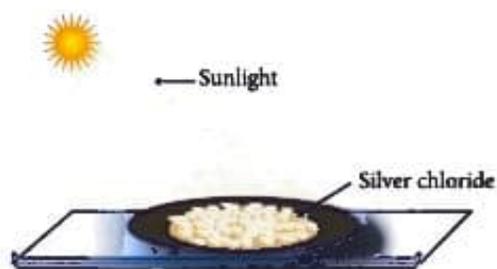
Photolysis / Photochemical Decomposition

When a decomposition reaction is carried out by the use of light energy, it is called Photolysis/Photochemical Decomposition.

Examples of Photolysis / Photochemical Decomposition

Reaction of silver chloride in presence of sunlight

White silver chloride turns grey in sunlight. This is due to the decomposition of silver chloride into silver and chlorine by light.



Photochemical decomposition of silver chloride to grey silver metal