

Chemical Reactions And Equations.

(Along with this refers Classroom notes and diagram)

Physical Change :

The change in which no new substances are formed is called as Physical Change.

E.g Melting of Ice

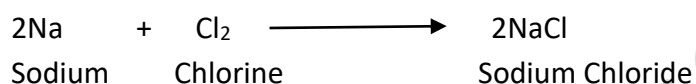
Chemical Change :

The change in which new substances are formed is called as Chemical Change.

E.g Conversion of Milk to Curd , Burning of Paper

Chemical Reaction :

The reaction in which new substances with new properties are formed is called as chemical reaction.

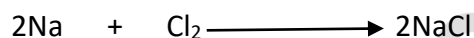


Reactant :

The substance used in a chemical reaction is called as Reactant .

Product :

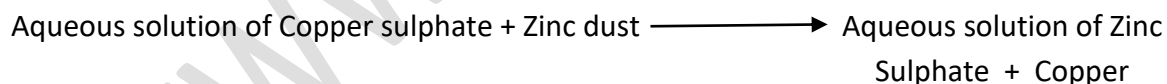
The substances formed in a chemical reaction is called as product.



In the above reaction 'Na' and 'Cl' are the reactant and 'NaCl' is product.

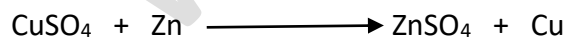
Word Equation :

The simple way of representing a chemical reaction in words is called as 'Word Equation'.



Chemical Equation :

The representation of chemical reaction in a condensed form using chemical formulae is called as Chemical equation .



Characteristics of Chemical reaction :

1. Release of gas
2. Change in colour
3. Change in temperature
4. Change in State
5. Formation of Precipitate

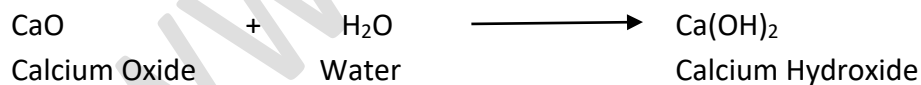
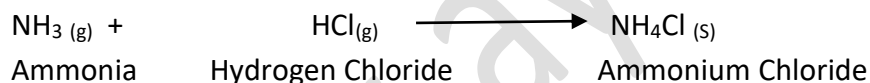
Symbol used during Chemical reaction :

Solid	(S)
Liquid	(L)
Gas	(G)
Aqueous	(Aq)
Liberation Of Gas	↑
Formation of Precipitate	↓
Temperature	$\xrightarrow{1000^{\circ}\text{C}}$
Catalyst	$\xrightarrow{\text{KMnO}_4}$
Reversible reaction	\rightleftharpoons

Types of Chemical reaction :

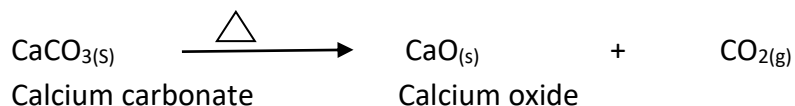
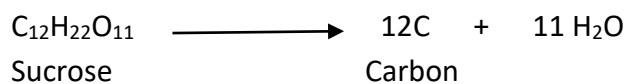
1. Combination reaction :

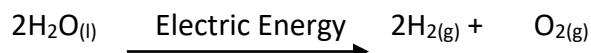
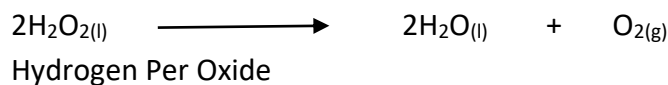
When two or more reactant combine in a reaction to form a single product is called as combination reaction.



2. Decomposition Reaction :

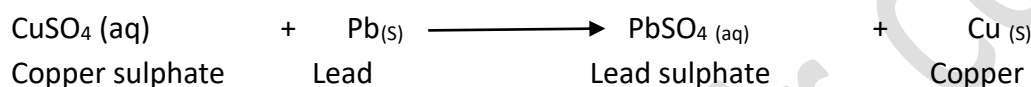
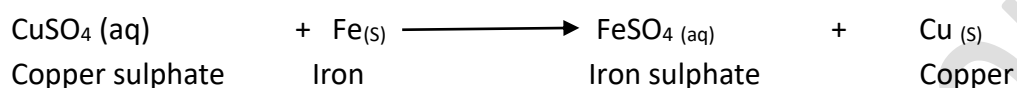
The chemical reaction in which two or more products are formed from single reactant is called 'Decomposition Reaction'.





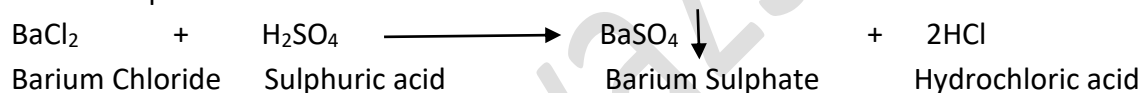
3. Displacement reaction:

The reaction in which place of ion of a less reactive element in a compound is taken up by another more reactive element by formation of its own ions, is called as Displacement reaction.



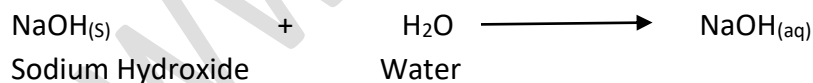
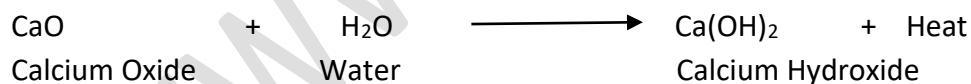
4. Double Displacement :

The reaction in which the in the reactants are exchanged to form a precipitate are called Double displacement reactions.



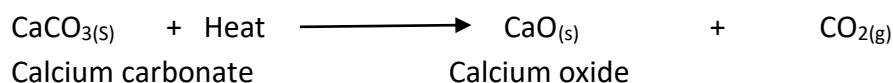
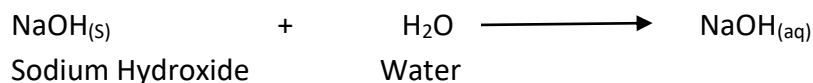
Exothermic Reaction :

The reaction in which there is release of energy is called as Exothermic reaction .



Endothermic Reaction :

The reaction in which there is absorption of energy is called as Endothermic reaction .



Rate of Chemical Reaction :

There are number of reaction which occurs with different speeds. Some reactions take more time to occur where as some required less time. This is what we call rate or speed of chemical reaction.

Factors Affecting Rate of chemical Reaction :

1.Nature of Reactant :

When Aluminium and Zinc are allowed to react with dil. HCl , hydrogen gas is evolved. It is observed that hydrogen gas is released more vigorously by Aluminium than zinc. It is because Aluminium is more reactive than Zinc. Thus from above it is clear that rate of reaction depends on nature of reactant.

2.Size of particles of reactant :

Take Shahbad stone and Shahbad Stone powder in two different test tube and small quantity of dilute HCl to it, it is observed that sffervescence of CO₂ is more vigorous in powder form than stone. Thus it is clear that rate of reaction also depends on size of particles.

3.Concentration of reactant :

When CaCO₃ is allowed to react with Dilute HCl and Concentrated HCl, it is observed that on completion of reaction it forms CaCl₂ and CO₂. But CO₂ is released more vigorously in conc.acid than dil.acid . Thus rate of reaction depends on concentration of reactant.

4.Temperature of the reactant :

It is observed that rate of reaction also depends on temperature. As the temperature increases kinetic energy of particles also increases and hence rate of reaction also increases.

5.Catalyst :

The substance which by its mere presence affect the rate of chemical reaction without undergoing in it is called as catalyst.

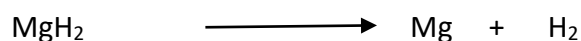
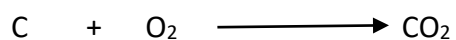
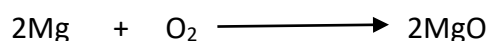
e.g. Potassium chlorate decompose slowly without catalyst , however it decomposes fastly in presence of catalyst MnO₂. MnO₂ remains unchanged in the chemical reaction.

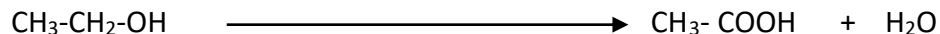


Oxidation and Reduction :

Oxidation :

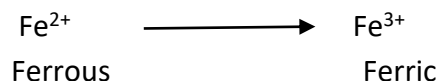
The reaction in which there is addition of oxygen or removal of Hydrogen is called as Oxidation





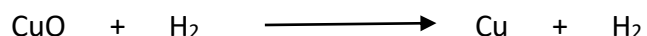
Here Potassium dichromate acts as Oxidising reaction. The substance which provides oxygen for reaction is called as oxidizing agent.

In terms of ions or charge , Oxidation can also be defined as loosing of one or more electron. Increase of Positive charge is called oxidation.



Reduction :

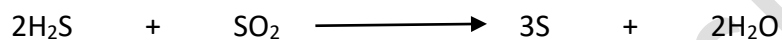
The reaction in which there is addition of hydrogen or removal of oxygen is called as reduction.



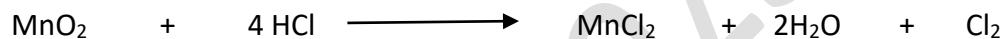
In terms of ions or charge , Reduction can also be defined as gaining of one or more electron.

Redox Reaction :

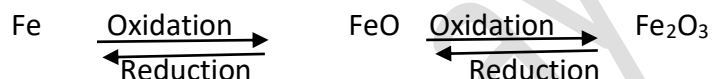
The reaction in which both oxidation and reduction takes place simultaneously is called as redox reaction.



Here Hydrogen sulphide is oxidized and sulphur di oxide is reduced



Here Mangnese di oxide is reduced and HCl is Oxidised



Rancidity :

Aerial oxidation of oils and fats which changes taste and smell of food is called as Rancidity.

Prevention of Rancidity :

- 1.Packing food items in nitrogen gas.
- 2.Using anti oxidant like Butylated hydroxyl Anisole and Butylated hydroxyl Toulene
- 3.Keeping food item in air tight container
- 4.By keeping food in refrigerator or away from light, we can slow down the rate of rancidity.

Corrosion :

The slow process of decay or decomposition of metal under the action of air, moisture or chemical is called as corrosion.

Corrosion of iron is called rusting.

Formula for rust is $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

The reddish brown coat seen over iron on corrosion is called as Rust.

Condition for Rust :

Water and oxygen are prime condition for rusting.

1. If an iron nail is placed in boiled water covered with oil layer in a test tube then we don't see any kind of corrosion. It is because on boiling water the oxygen is removed out.

2. If an iron nail is placed in salt solution present in test tube then we saw corrosion. It is because in salty water both oxygen and water is present.

3. If an iron nail is placed in test tube having air then we saw corrosion. It is because in air both oxygen and water is present.

4. If an iron nail is placed in test tube having air and calcium chloride and covered by cork then we don't saw corrosion. It is because in this case only oxygen is present but water is absent.

Some imp. chemical reactions included in chapter are :

