

CHEMISTRY STUDY MATERIALS FOR CLASS 10

(NCERT Based notes of Chapter -01)

GANESH KUMAR

DATE:- 15/04/2021

CHEMICAL REACTIONS AND EQUATIONS

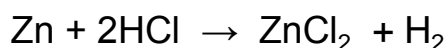
DISPLACEMENT REACTION

Reactions in which atoms or ions move from one compound to other to form new compound are known as DISPLACEMENT REACTION. Displacement reaction is also known as Substitution Reaction or Single displacement /Replacement Reaction

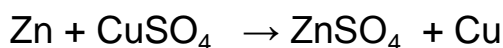
A general displacement reaction can be represented using chemical equation as follows:



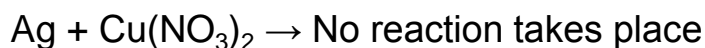
Displacement reaction takes place only when 'A' is more reactive than B. If 'B' is more reactive than 'A', then 'A' will not displace 'C' from 'BC' and reaction will not be taken place. **Example:** When zinc reacts with hydrochloric acid, it gives hydrogen gas and zinc chloride.



When zinc reacts with copper sulphate, it forms zinc sulphate and copper metal.



When silver metal is dipped in copper nitrate, no reaction takes place because silver metal is less reactive than copper.

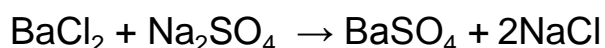


DOUBLE DISPLACEMENT REACTION

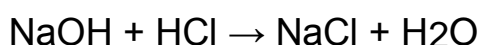
Reactions in which ions are exchanged between two reactants forming new compounds are called double displacement reactions.



Example: When solution of barium chloride reacts with the solution of sodium sulphate, white precipitate of barium sulphate is formed along with sodium chloride.



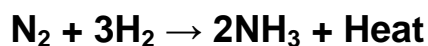
When sodium hydroxide (a base) reacts with hydrochloric acid, sodium chloride and water are formed.



Double displacement reaction, in which precipitate is formed, is also known as precipitation reaction. Neutralisation reactions are also examples of double displacement reaction.

EXOTHERMIC AND ENDOTHERMIC REACTION

The chemical reactions which proceed with the evolution of heat energy are called exothermic reactions.



All combustion reactions are exothermic. Heat energy is liberated as the reaction proceeds.

The chemical reactions which proceed with the absorption of heat energy are called endothermic reactions.



Most of the combination reactions are endothermic. Most of the decomposition reactions are exothermic. Respiration is a decomposition reaction in which energy is released. When quick lime (calcium carbonate) is added to water, it decomposes and releases energy. Cooking involves chemical reactions which are endothermic as cooking is possible because of heating.

OXIDATION AND REDUCTION REACTION:

Oxidation: Addition of oxygen or non-metallic element or removal of hydrogen or metallic element from a compound is known as oxidation.

Elements or compounds in which oxygen or non-metallic element is added or hydrogen or metallic element is removed are called to be oxidized.

Oxidizing agent: Compounds which can add oxygen or a non-metallic compound or remove hydrogen or metallic element are known as oxidizing agents.

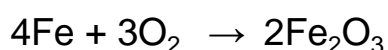
Reduction: Addition of hydrogen or metallic element or removal of oxygen or non-metallic element from a compound is called reduction. The compound or element which goes under reduction is called to be reduced.

Reducing agent: Compounds or elements which can cause reduction are called reducing agents.

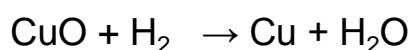
In a chemical reaction oxidation and reduction both take place simultaneously and such reactions are also known as REDOX REACTIONS.

In the word REDOX, 'Red' stands for reduction and 'Ox' stands for oxidation.

Example: When iron reacts with air, it forms iron oxide (rust)

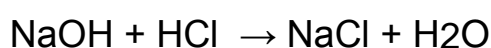


In this reaction, oxygen is added to iron, thus, iron is oxidized. Here oxygen is oxidizing agent. When cupric oxide reacts with hydrogen, it gives copper and water.



In this reaction, oxygen is removed from copper and oxygen is added to hydrogen. So, cupric oxide is reduced to copper and hydrogen is oxidized to water. Cupric oxide is oxidizing agent and hydrogen is reducing agent.

When sodium hydroxide reacts with hydrochloric acid, it gives sodium chloride and water.



In this reaction, sodium hydroxide is reduced to sodium chloride since hydrogen is removed from sodium hydroxide. Hydrochloric acid is oxidized to water, since oxygen is added to hydrogen chloride and non-metallic element chloride is removed. Sodium hydroxide is oxidising agent and hydrochloric acid is reducing agent.

In this reaction oxidation and reduction both takes place simultaneously, Thus it is an example of redox reaction.

SIGNIFICANCE OF OXIDATION REDUCTION IN EVERYDAY LIFE:

- Respiration is oxidation reaction in which food is oxidized to produce energy.
- Iron gets oxidized to form rust; which leads to corrosion of iron in the long run.
- Most of the metals react with atmospheric oxygen and it leads to formation of a layer on the metal article. The metal gets corroded in the long run.
- Rusting of iron can be prevented by painting the iron article. This can also be prevented by applying a layer of zinc over iron article. This process is known as galvanization.
- Fried food gets oxidized when exposed to air. This spoils the taste of the food and the food becomes unfit for consumption. The spoiling of fried food because of oxidation is called rancidity. Fried food is often packed in airtight packets to prevent rancidity.

We are able to utilize various types of fuel because of oxidation. Oxidation of fuel helps in producing energy.
