

Image

CHP-01
Chemical Reaction and Equation

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Whenever a chemical change occurs we say that chemical reaction has taken place.

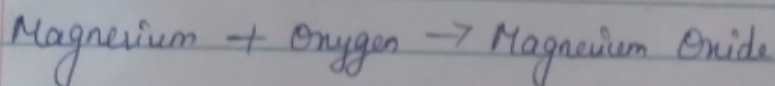
Observations during a chemical reactions:-

- i) Change in state
- ii) Change in colour
- iii) Change in Temperature
- iv) Evolution of gas

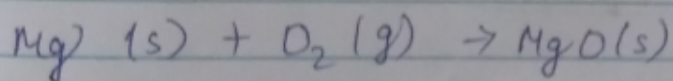
Chemical Reaction

A process in which one or more substances (reactants) are converted to one or more different substances (i.e., products).

* Substances are either chemical elements or compounds.



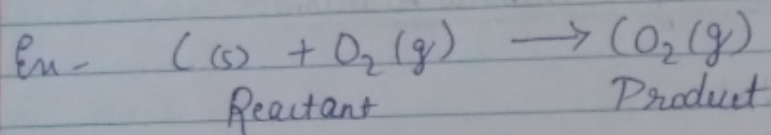
Chemical Equation:- The symbolic representation of a chemical reaction is called a chemical equation.



Features of a Chemical Equation:-

- i) The Reactants are written on the left hand side with a plus sign (+) between them.
- ii) The products are written on the right hand side with a plus sign (+) between them.

iii) An arrow separates the reactants from the products. The arrow head points towards the products and indicates the direction of the reaction.



Chemical Equations - The method of representing a chemical ~~equation~~ ~~equat~~ reaction with the help of symbols and formulae of a substance involved in it is known as chemical equation.

It is of two types:-

(i) Word Equations

e.g., - Zinc + Sulphuric acid \rightarrow Zinc sulphate + Hydrogen

(ii) Skeletal Equations

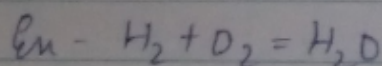
e.g. $\rightarrow \text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$

Balanced Chemical Equation

A balanced chemical equation has an equal number of atoms of different element in the reactant and product.

Unbalanced Chemical Equation

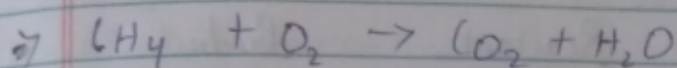
An Unbalanced chemical equation has an unequal number of atoms of one or more element in the reactant and product.



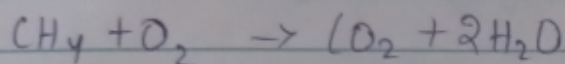
Balancing Of Chemical Equations

By Heat & Trial Method

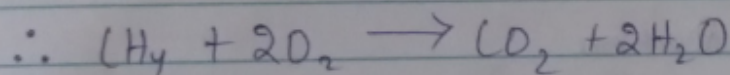
1) Methane + Oxygen \rightarrow Carbon Dioxide + Water



	Reactant	Product
No. of "C" atoms	1	1
No. of "H" atoms	4	2x2
No. of "O" atoms	2	3

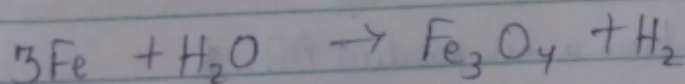


	Reactant	Product
No. of "C" atoms	1	1
No. of "H" atoms	4	4
No. of "O" atoms	2x2	4

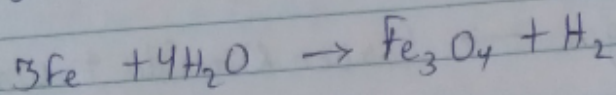


2) $\text{Fe} + \text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$

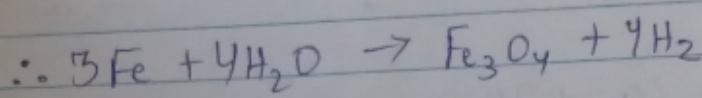
	Reactant	Product
No. of "Fe" atoms	1x3	3
No. of "H" atoms	2	2
No. of "O" atoms	1	4



	Reactant	Product
No. of "Fe" atom	3	3
No. of "H" atom	2	2
No. of "O" atom	1 x 4	4



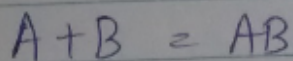
	Reactant	Product
No. of "Fe" atom	3	3
No. of "H" atom	8	2 x 4
No. of "O" atom	4	4



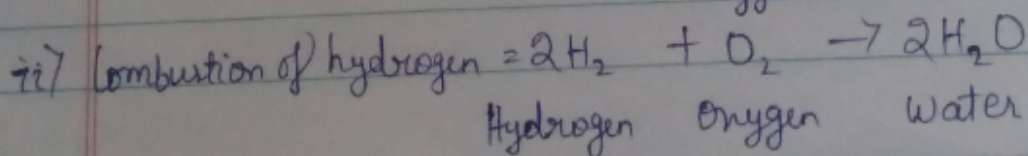
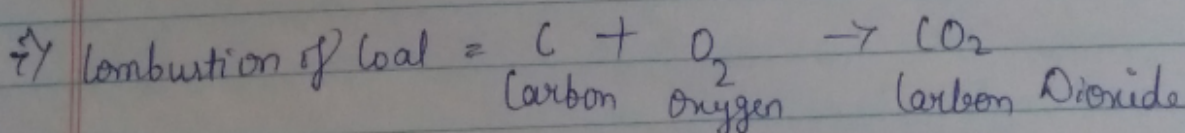
Types of Chemical Reactions

1. Combination Reactions
2. Decomposition Reactions
3. Displacement Reactions
4. Double Displacement Reactions
5. Oxidation & Reduction Reactions

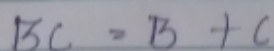
1. Combination Reactions → These reactions, in which two or more substances combine to form a new compound, are called combination reactions. The reactants in such reactions can be elements as well as compounds.



A combines with B to form a new product AB.

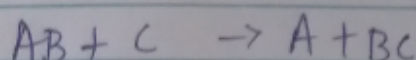


2) **Decomposition Reaction** → These reaction in which a compound breaks down or decomposes to form two or more substances are called decomposition reactions.

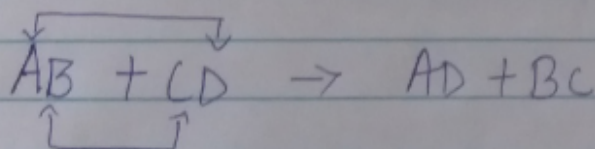


Compound BC splits into products B and C. It is the representation of decomposition reaction.

3) **Displacement Reaction** → These reactions in which a more reactive element replaces a less reactive element from the salt solution of less reactive element is known as displacement reaction. Both metals & non-metals take part in displacement reaction.



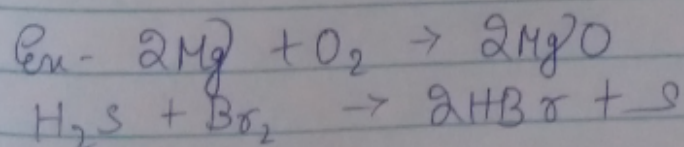
4) **Double Displacement Reaction** → It is bimolecular process in which parts of two compounds are exchanged to give two new compounds.



5) **Oxidation - Reduction Reaction** →

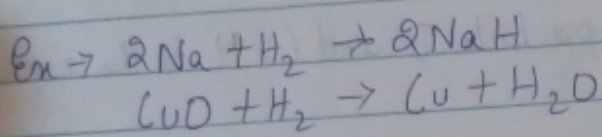
Oxidation

A chemical reaction which involves addition of oxygen or removal of hydrogen or loss of electron (s) is called as oxidation.



Reduction →

A chemical reaction which involves addition of hydrogen or removal of oxygen or gain of electron (s) is called as reduction.



Oxidising Agents

The substances that are reduced (provide oxygen or remove hydrogen) in course of the reaction are oxidising agents.

Rancidity

When fats and oils present in ~~butter~~ butter & margarine are oxidised, they become rancid. As a result, their smell and taste change. They become quite unpleasant. This is called rancidity.

Corrosion

When a metal is attacked by substances around it such as moisture, acids, etc. it is said to corrode and the process is called corrosion.

