

Chemical reactions and equations

Notes

Course Content

- I Types of changes
- II chemical reactions
- III chemical equations
- IV Different type of chemical reactions
- V Oxidation and Reduction reactions
- VI Oxidising and Reducing agents
- VII Balancing of chemical equations
- VIII Corrosion and Rusting (Prevention of rusting)
- IX Rancidity

I Types of changes

Physical change - A physical change, refers to a change in the physical properties of a substance without altering its chemical composition. In other words, during a physical reaction, the substance undergoes a change in its appearance or state, but the arrangement of its atoms and molecules remains the same.

(change in attraction of atoms & molecules)

Chemical change - A chemical reaction refers to a process in which one or more substances, called reactants, undergo a transformation to form new substances, known as products, with different chemical properties. During a chemical reaction, the bonds between atoms in the reactants are broken and rearranged to form new bonds, resulting in a change in the chemical composition of the substances involved. (Transfer or sharing of electrons).

Radioactive change - Radioactivity is the phenomenon exhibited by an atom's nuclei due to nuclear instability. Radioactivity is a process by which the nucleus of an unstable atom loses energy by emitting radiation.

II What is chemical reaction?

A chemical reaction is a process which transforms one or more substances into new substances. During chemical reactions, new substances with new properties are formed.

The substances which take part in a chemical reaction are called reactants, and the substances which are formed as a result are called products.

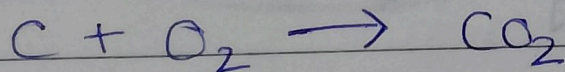
Identification of chemical reactions -

- Evolution of Gas
- change in colour
- change in state
- change in temperature
- Formation of precipitation

What is chemical equation ?

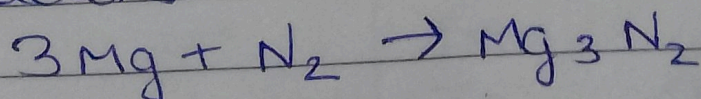
Symbolic representation of chemical reaction in terms of symbols and formulas of reactants and the product which will give idea about true chemical change.

'Carbon' reacts with 'oxygen' gas to produce carbon dioxide.

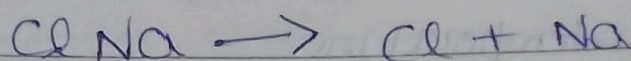


Types of chemical reactions

Combination Reactions - Those chemical reactions which involve the combination of two or more substances to form a single new substance are called combination reactions.

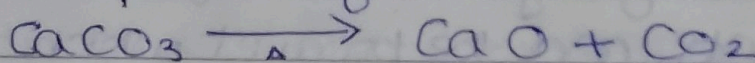


Decomposition reaction - Those chemical reactions in which a compound breaks down to produce two or more simpler substances are known as decomposition reactions.

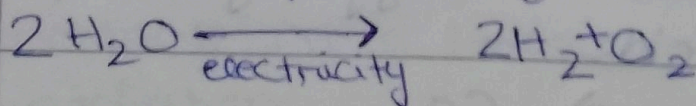


Types of decomposition reactions

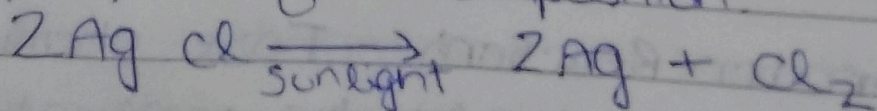
Thermal decomposition - These reactions use the energy in the form of heat for decomposition of the reactant.



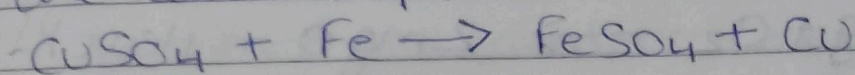
Electrolysis decomposition - These reactions involve the use of electric energy for the decomposition of the reactant.



Photolysis decomposition - These reactions involve the use of light energy for the purpose of decomposition.

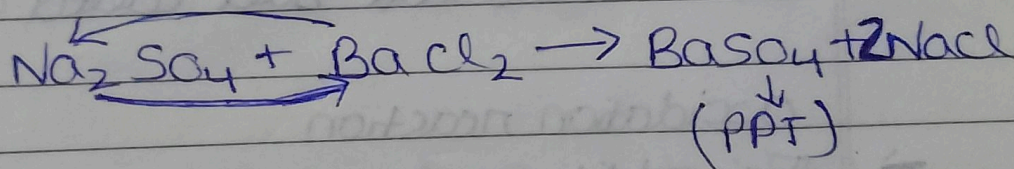
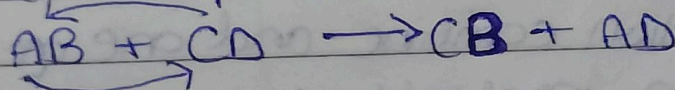


3 Displacement reactions - Those reactions in which a more active element displaces or removes less active element from a compound are called displacement reactions.



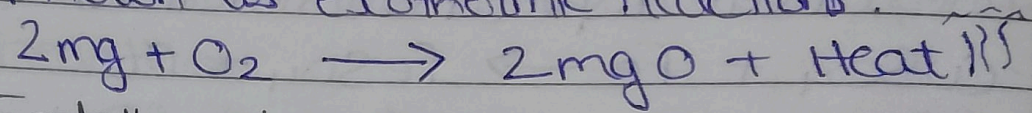
Fe displaces less active element Cu

4 Double displacement reactions - The reaction in which two different atoms or group of atoms are displaced by other atoms or group of atoms or in which two compounds react by an exchange or displacement of ions to form new compounds are called double displacement reactions.

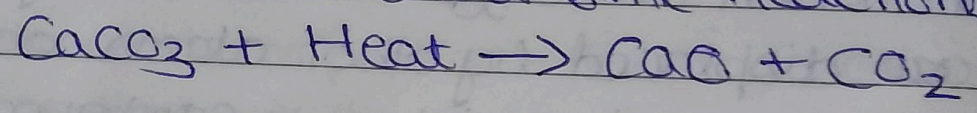


Decreasing order of reactivity ↓	Lithium - L	Copper - Cu
	Potassium K	Mercury - Hg
	Sodium Na	Silver - Ag
	Calcium Ca	Gold - Au
	Magnesium Mg	
	Aluminium Al	
	Zinc Zn	
	Iron Fe	
	Tin Sn	
	Lead Pb	

- Exothermic reaction - The chemical reaction in which formation of products, is accompanied by evolution of heat are known as exothermic reactions.



- Endothermic reaction - The chemical reaction in which formation of products is accompanied by the absorption of heat are known as endothermic reactions.



Precipitation reaction - A precipitation reaction is a type of chemical reaction in which two soluble salts in aqueous solution combine and one of the products is an insoluble salt called a precipitate.

Oxidation reaction

- The addition of oxygen to a substance is called oxidation.
- The removal of hydrogen from a substance is also called oxidation.

Loss of electron

Gain in oxidation number

Reduction reaction

- The addition of hydrogen to a substance is called reduction.
- The removal of oxygen from a substance is also called reduction.

Gain of electron

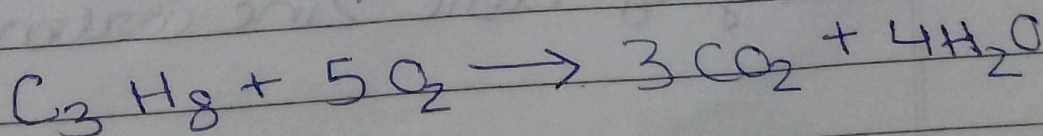
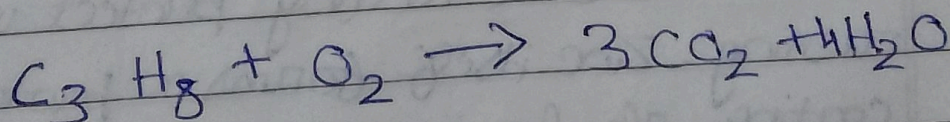
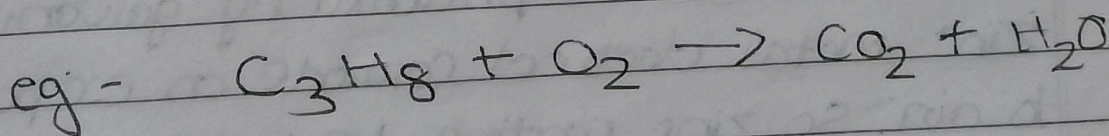
Loss in oxidation number

Oxidising and Reducing agent

Oxidising agent - A substance that oxidises other and in return gets reduced itself by gain of electron is called oxidising agent.

Reducing agent - A substance which reduces the other one and gets oxidised itself by loss of electron is called a reducing agent.

Balancing of chemical equations



Corrosion and Rusting

Corrosion - The phenomenon due to which metals are slowly eaten away by the reaction of air, water and chemicals present in the atmosphere is called corrosion.

The corrosion of iron is precisely known as rusting.

Prevention of Rusting

Rusting of Iron can be prevented by covering its surface by paints, grease that does not allow air and moisture to come in contact with it and no rusting occurs. This is known as barrier protection.

It also can be prevented by galvanization. Zinc metal does not corrode on exposure to air. So zinc coating protect iron from rusting. Zinc itself forms a protective coating of basic zinc carbonate.