H.P. INTERNATIONAL SCHOOL BUDAUN

HARSHIT GUPTA

class - 10 sub- chemistry

Chemical Reactions And Chemical Equations (Remaining)

Types of chemical reactions

6. Exothermic reactions :- Exothermic word is made up of two words.

Exothermic → Exo + Thermic

Exo → out

Thermic → heat

Thus," An **exothermic reaction** is a chemical reaction that releases (librates) energy through light or heat".

For example:-

1. Reaction of lime (calcium oxide) with water librates large amount of heat.

$$CaO + H_2O \rightarrow Ca(OH)_2 + Heat$$

2. carbon burns in oxygen (air) to form carbon dioxide, and librating a large amount of heat.

$$C + O_2 \rightarrow CO_2 + Heat$$

some other examples are-

⇨Dissolution of concentrated sulphuric acid in water.

⇨Dissolution of caustic soda (sodium hydroxide) in water.

7. <u>Endothermic reactions</u> :- Endothermic word is made up of two words.

Endothermic → Endo + Thermic

↓ ↓

in heat

Thus," An **endothermic reaction** is a chemical reaction in which heat is absorbed ". It is the opposite of an exothermic reaction.

For example:-

1. Nitrogen reacts with oxygen at about 3000°C to form nitric oxide.

$$N_2 + O_2 + Heat \xrightarrow{3000°C} 2NO$$

2. when steam is passed over the red hot coke then water gas is formed (mixture of CO and H_2).

$$C + H_2O + Heat \rightarrow \underbrace{CO + H_2}_{\text{water gas}}$$

some other examples are-

⇨Dissolution of sugar in water.

⇨Dissolution of ammonium chloride in water.

⇨Conversion of water to steam

8. Neutralisation reactions :- When one mole of acid reacts with one mole of base then salt and water are formed. this reaction is known as **neutralisation reaction**.

For example:-

1. Sodium hydroxide reacts with hydrochloric acid to form sodium chloride(salt) and water.

$$NaOH + HCl \rightarrow NaCl + H_2O$$

2. Zinc oxide reacts with sulphuic acid to form zinc sulphate and water.

$$ZnO + H_2SO_4 \rightarrow ZnSO_4 + H_2O$$

9. Oxidation-reduction reactions or Red-ox reactions :-

Redox word is made up of two words.

Redox → **Red** (↓ Reduction) + **Ox** (↓ Oxidation)

Thus, the reactions which involve both oxidation and reduction, are known as **oxidation-reduction reaction** or **Redox reaction**.

A. Oxidation reactions :- Addition of oxygen or any electronegative element is known as **oxidation**.

For example:-

1. Sulphur dioxide is oxidised by oxygen into sulphur trioxide.

$$\underbrace{2SO_2 + O_2 \rightarrow 2SO_3}_{\text{oxidation}}$$

2. carbon is oxidised into carbon di oxide by burning in the air(oxygen).

$$\underset{\text{oxidation}}{C + O_2 \rightarrow CO_2}$$

3. zinc metal is oxidised in zinc chloride by HCl Acid.

$$\underset{\text{oxidation}}{Zn + 2HCl \rightarrow ZnCl_2} + H_2$$

Removal of hydrogen or any electropositive element is also known as **oxidation**.

For example:-

1. Hydrogen sulphide is oxidised by bromine to sulphur.

$$\underset{\text{oxidation}}{H_2S + Br_2 \rightarrow 2HBr + S}$$

B. Reduction reactions :-Addition of hydrogen or any electropositive element is also known as **Reduction**.

For example:- 1. Chlorine is redused by hydrogen sulphide to HCl.

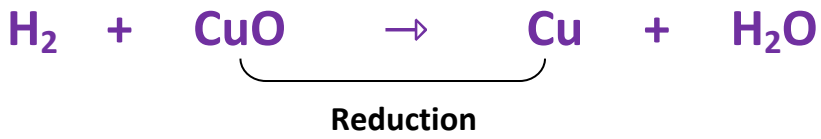
$$H_2S + \underset{\text{Reduction}}{Cl_2 \rightarrow 2HCl} + S$$

2. Oxygen is redused by sodium metal into sodium oxide.

$$4Na + \underset{\text{Reduction}}{O_2 \rightarrow 2Na_2O}$$

Removal of oxygen or any electronegative element is also known as **Reduction.**

For example :- When hydrogen gas is passed over heated cupric oxide (CuO) then cupric oxide reduces into copper.

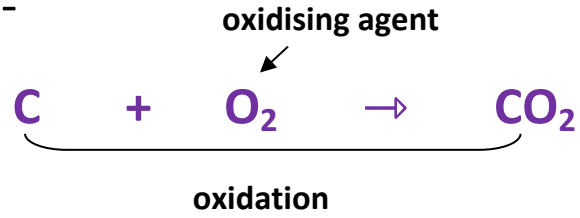


C. Oxidising and Reducing agents :-

Oxidising agent:- The substance which oxidises other substances, is known as **oxidising agent**. In the other words we can also say that," the substance which undergoes reduction, is known as oxidising agent".

For example :-

1.



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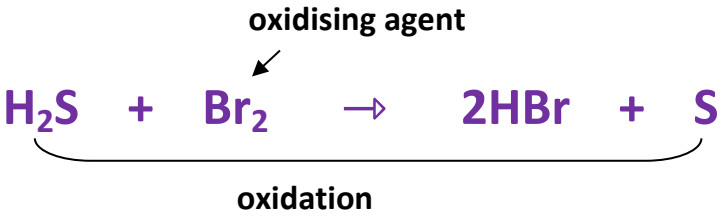
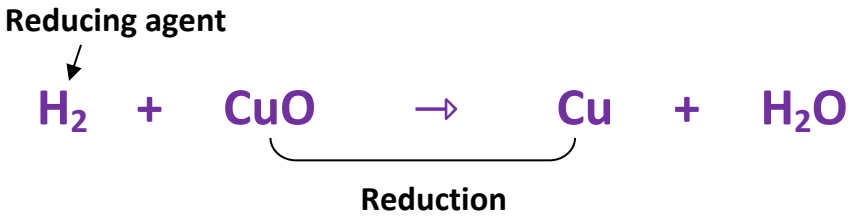


Reducing agent:- The substance which reduces other substances, is known as **Reducing agent**. In the other words we can also say that," the substance which undergoes oxidation, is known as **Reducing agent** ".

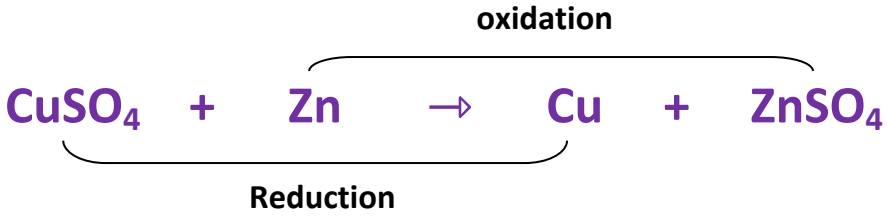
For example :- 1.

2.

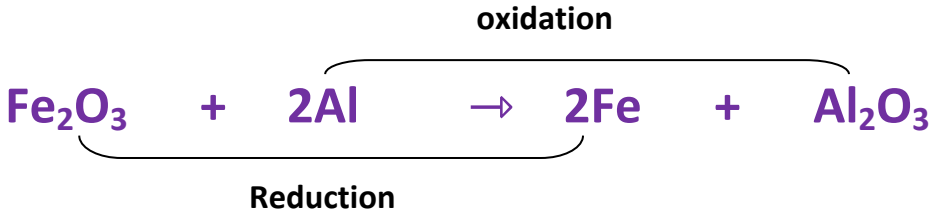


Some examples of redox reactions

1. Displacement of copper from copper suphate solution by zinc is a redox reaction.



2. In Thermite process, iron (III) oxide (ferric oxide) gets reduced into iron by aluminum metal powder.



Effects of oxidation reactions in everyday life

1. Corrosion :- Corrosion is a natural process that converts a refined metal into a more chemically-stable form such as oxide. so it is a oxidation process.

Thus," the gradual destruction of materials (usually a metal) by chemical or electrochemical reaction with their environment, is called **corrosion**".

corrosion occurs due to formation of electrochemical cell on the surface of metal. when metal come in contact with moisture then moisture absorb gases from the air which work as an electrolyte and corrode the metal. thus, we can say that **corrosion needs Oxygen and moisture to take place and is accelerated by the presence of electrolyte in water**.

Some examples of corrosion are-

1. Iron gets rusted with a a brown coloured layer of iron oxide.

2. Copper and brass get a green coloured deposit on their surfaces.

3. Silver gets tarnished i.e., it loses its shine.

Prevention from corrosion

Corrosion can be prevented by coating the surface of metal with paint, oil, grease, etc.

corrosion can also be prevented by **electroplating** which is the phenomenon of coating a thin layer of other metal which does not corrode.

2. Rancidity :- Rancidity is the process of complete or incomplete oxidation or hydrolysis of fats and oils when exposed to air, light, or moisture or by bacterial action, resulting in unpleasant taste and smell. Rancidity is due to a process which

converts esters present in the oil into 3 fatty acids by reacting with air, moisture, etc.

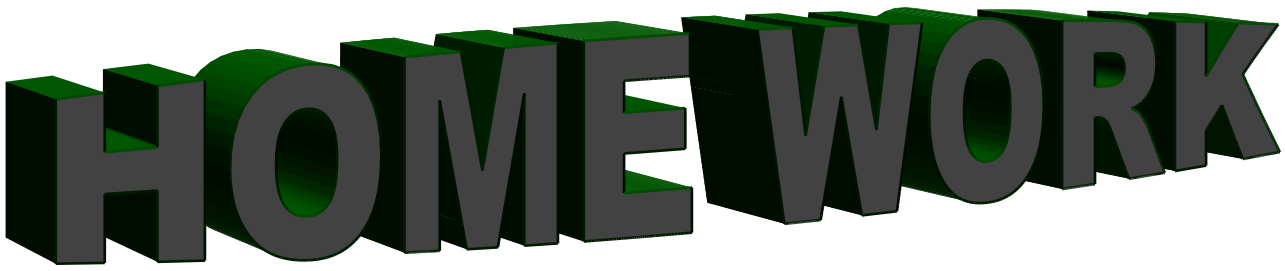
For example:- when you left oil containing food materials such as chips, namkeen, etc. for a long time then the taste and smell of of foodstuff have gone bad due to the degradation of oil or fat.

Prevention from rancidity

1.The best way to prevent rancidity, is to add an antioxidant in the foodstuff.

2. Keeping food in airtight containers which helps to slow down oxidation, hence delays rancidity.

3. Chips, namkeen are packed in in oxygen free nitrogen gas. Which prevent the oxidation of oil or fat of food material



All NCERT questions.

Thank you