CONTENTS

Contents

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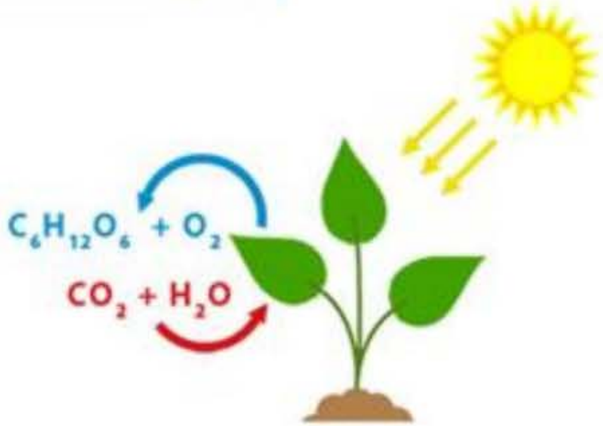
Examples of Chemical Change

Fireworks

Frying eggs



Photosynthesis

Burning wood

Combustion of propane

Digestion

Chemical Reactions (रासायनिक अभिक्रियाएँ)

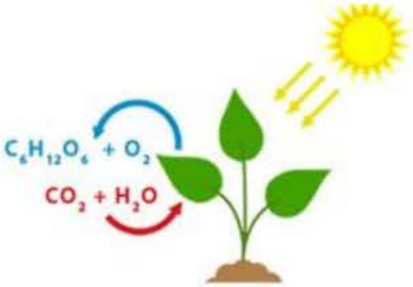
Chopping wood

Folding paper

Breaking egg

Fireworks

Frying eggs



Photosynthesis

Physical Changes भौतिक परिवर्तन	Chemical Changes रासायनिक परिवर्तन
No new substance is formed कोई नया पदार्थ नहीं बनता	**New Substance** is formed नया पदार्थ बनता है
This change is **reversible** **यह परिवर्तन प्रतिवर्ती है**	This change is **normally irreversible** **यह परिवर्तन सामान्यतः अपरिवर्तनीय है**
Very little heat or light energy is absorbed or given out in Physical change भौतिक परिवर्तन में बहुत कम ऊष्मा या प्रकाश ऊर्जा अवशोषित या दी जाती है	**A lot of heat or light energy is involved** in process इस प्रक्रिया में बहुत अधिक ऊष्मा या प्रकाश ऊर्जा शामिल होती है

01 निम्नलिखित में से कौन सा भौतिक परिवर्तन नहीं है?

Which Of The Following Is Not A Physical Change?

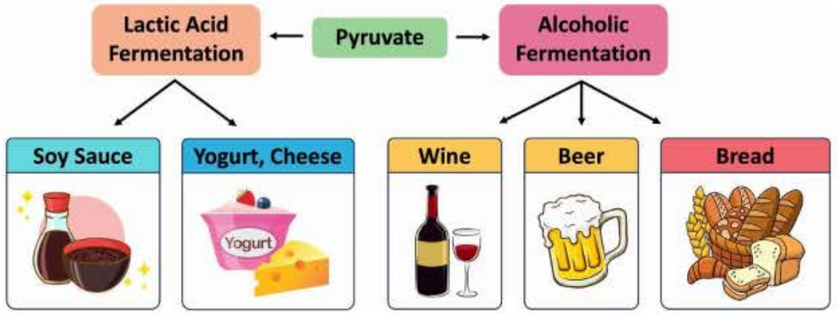
(A) ठोसों का द्रवों में पिघलना / Melting Of Solids Into Liquids ✓

(B) गैसों का द्रवों में द्रवीकरण / Liquefaction Of Gases Into Liquids (✓)

P ↑ ⟶

(C) पदार्थों का किण्वन / Fermentation Of Substances – chemical process

(D) द्रवों का गैसों में वाष्पीकरण / Evaporation Of Liquids Into Gases



02 इनमें से कौन-सा एक रासायनिक परिवर्तन है?

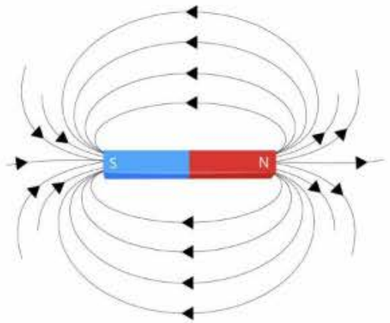
Which Of The Following Is A Chemical Change?

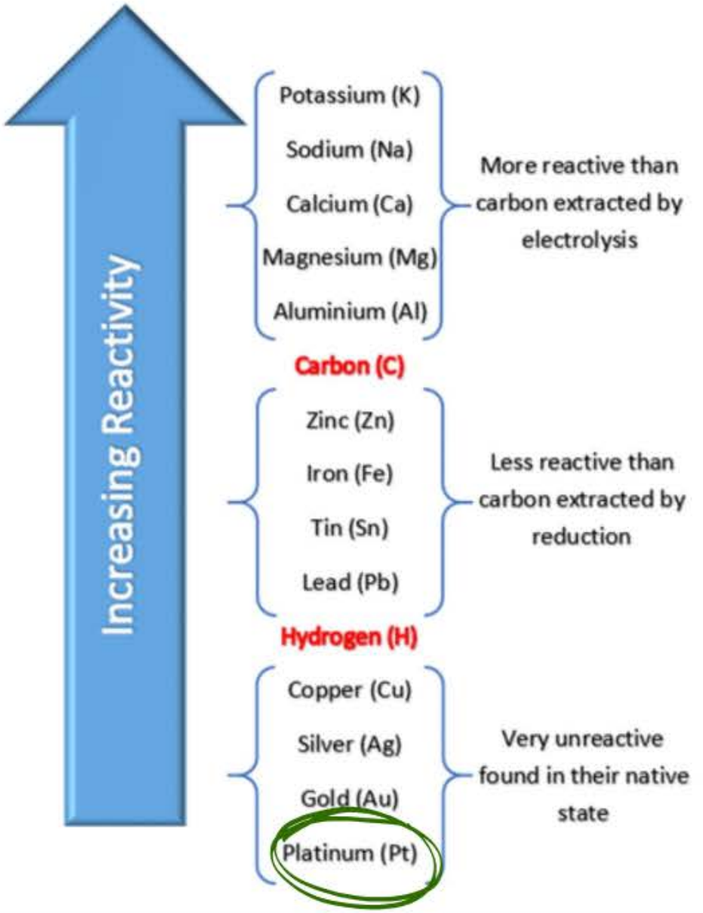
(A) मक्खन का खट्टा होना / Sourness Of Butter

(B) CO_2 से सूखी बर्फ बनाना / Making Dry Ice From CO_2

(C) एक प्लैटिनम तार का गर्म होना / Heating Of A Platinum Wire

(D) लोहे का चुंबकीयकरण / Magnetization Of Iron





03

इनमें से कौन-सा रासायनिक परिवर्तन का एक उदाहरण है?

Which of the following is an example of a chemical chan

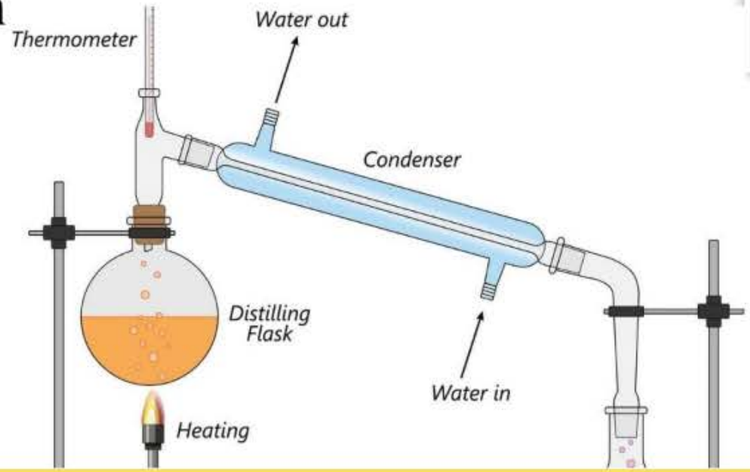
Chemistry - 2nd class

(A) ऊर्ध्वपातन / Sublimation S → G ✗

(B) क्रिस्टलीकरण / Crystallization → L → S ✗

(C) निष्क्रियीकरण / Neutralization — Acid + Base

(D) आसवन / Distillation



04 निम्नलिखित में से कौन सा अवलोकन हमें यह निर्धारित करने में मदद करता है कि रासायनिक अभिक्रिया हुई है या नहीं?

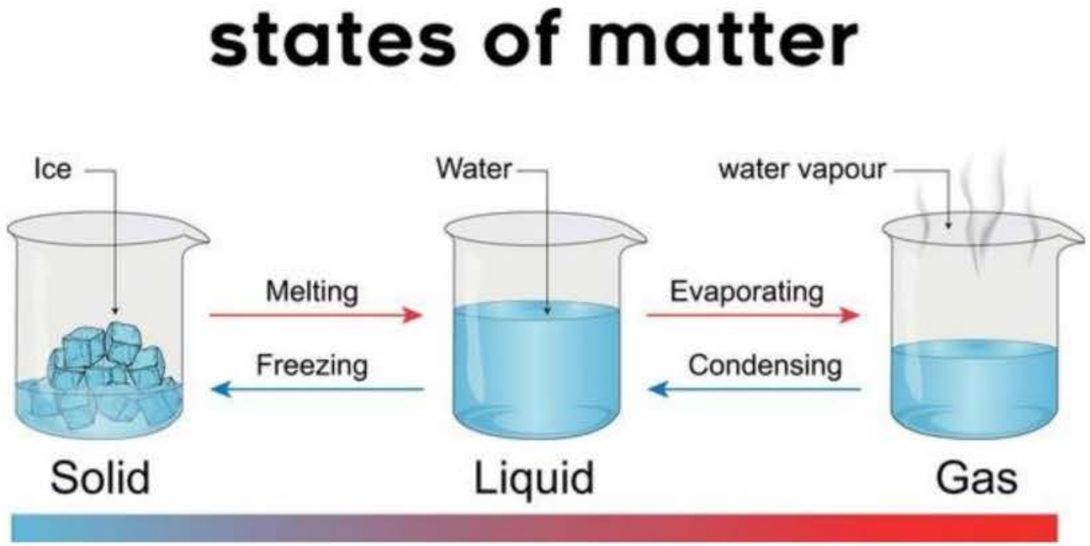
Which Of The Following Observations Helps Us Determine Whether A Chemical Reaction Has Occurred Or Not?

(A) अवस्था में परिवर्तन / Change In State ✓

(B) गैस का उत्सर्जन / Gas Emissions ✓

(C) रंग बदलना / Change Color ✓

(D) ये सभी विकल्प / All These Options ✓



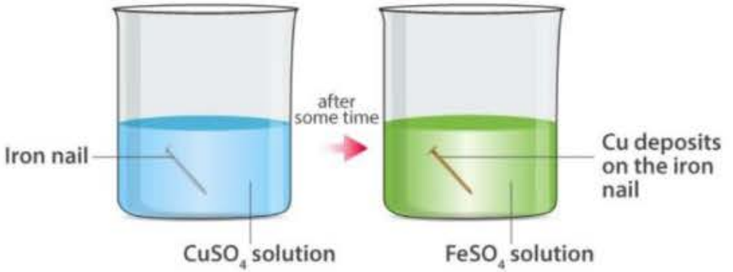
रासायनिक अभिक्रिया की पहचान Chemical Change

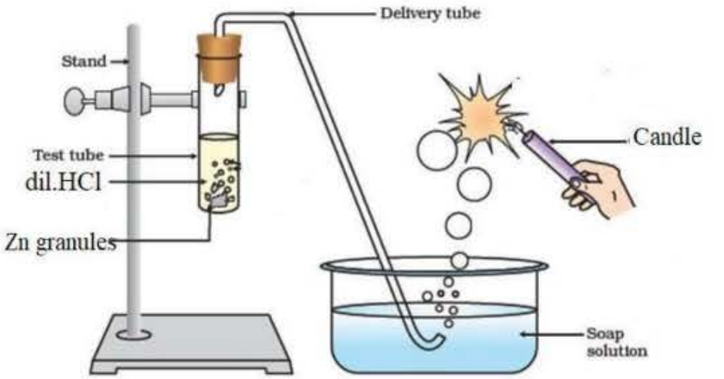
Chemical Change Takes Place, It Usually Leads To Following:

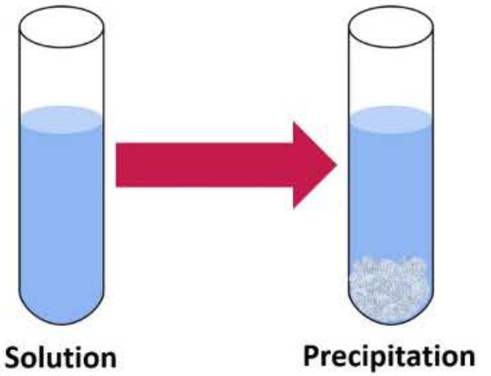
1. Change IN STATE / पदार्थ की अवस्था में परिवर्तन (✓)
2. Change IN COLOR / रंग में परिवर्तन (✓)
3. Evolution OF Gas (Gas BEING FORMED) /गैस का विकास (✓)
4. Change IN Temperature /तापमान में परिवर्तन (✓)
5. Formation OF PRECIPITATE /अवक्षेप का निर्माण (✓)

- change in state
- change in colour
- evolution of a gas
- change in temperature.

CHANGE IN COLOR








PC MAX — 2 / 3

Chemical Equation - रासायनिक समीकरण

Reactant
अभिकारक

Arrow

Product (उत्पाद)

$$Mg + O_2 \longrightarrow MgO$$

Reaction में भाग.

The word-equation for the above reaction would be –

Magnesium + Oxygen → Magnesium oxide (1.1)
(Reactants) (Product)

The substances that undergo chemical change in the reaction (1.1), magnesium and oxygen, are the reactants. The new substance is magnesium oxide, formed during the reaction, as a product.

Chemical Equation - रासायनिक समीकरण

$$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$$

[अभिकरकों के बीच (+) चिन्ह] ↑ [उत्पादों के बीच (+) चिन्ह]

बायीं ओर — तीर — दायीं ओर

Chemical Equation - रासायनिक समीकरण

Sometimes the reaction conditions, such as temperature, pressure, catalyst, etc., for the reaction are indicated above and/or below the arrow in the equation. For example –

$$CO(g) + 2H_2(g) \xrightarrow{340\,atm} CH_3OH(l) \quad (1.11)$$

Pressure, तापमान, Catalyst

$$6CO_2(aq) + 12H_2O(l) \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6(aq) + 6O_2(aq) + 6H_2O(l) \quad (1.12)$$

27°C

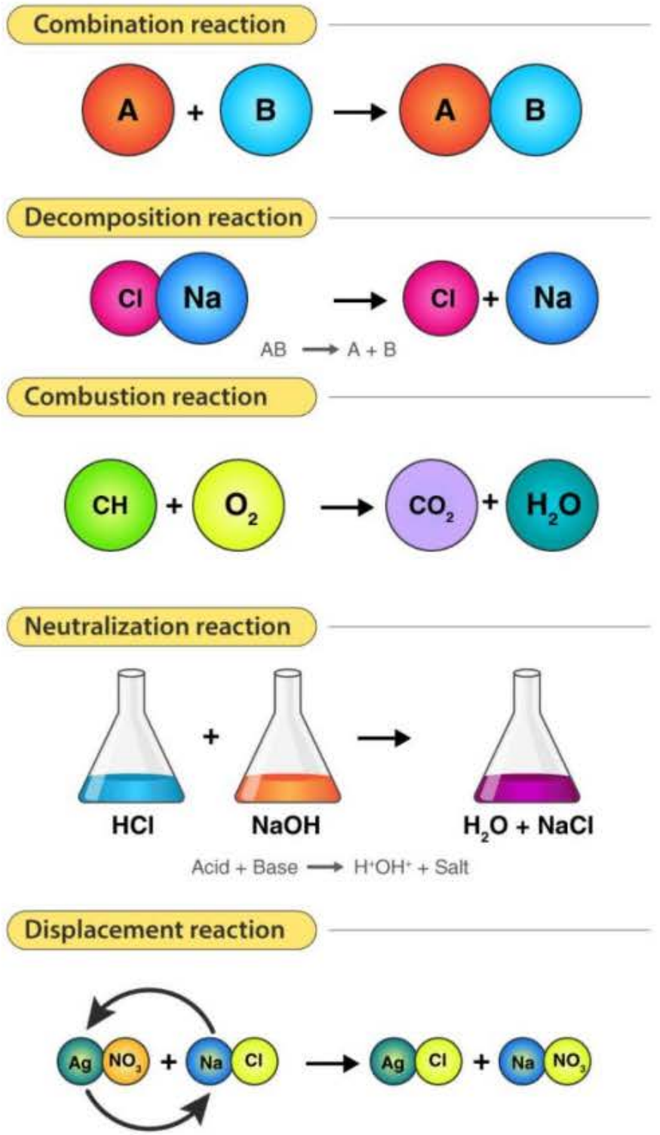
(Glucose)

Last 5 min

रासायनिक अभिक्रियाएँ निम्न प्रकार की होती है

Chemical Reactions Are Of The Following Types

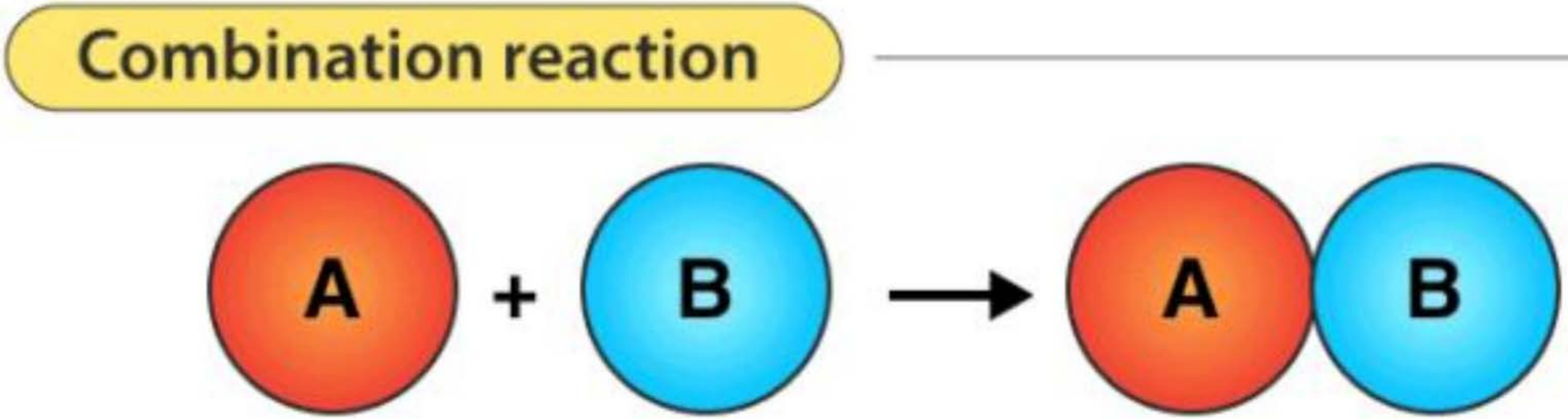
1. संयोजन अभिक्रिया / Combination Reaction ✓
2. वियोजन या अपघटन अभिक्रिया / Decomposition Reaction ✓
3. विस्थापन अभिक्रिया / Displacement Reaction ✓
4. द्वि-विस्थापन /Double -Displacement ✓
5. उपचयन एवं अपचयन / Oxidation And Reduction ✓



1. संयोजन अभिक्रिया :- Combination Reaction

•वह अभिक्रिया **जिसमें दो या दो से अधिक अभिकारकों** से एक **एकल उत्पाद का निर्माण होता** है तो ऐसी अभिक्रिया को संयोजन अभिक्रिया कहते है

•A Reaction In Which A **Single Product Is Formed From** Two Or More Reactants Is Called A Combination Reaction



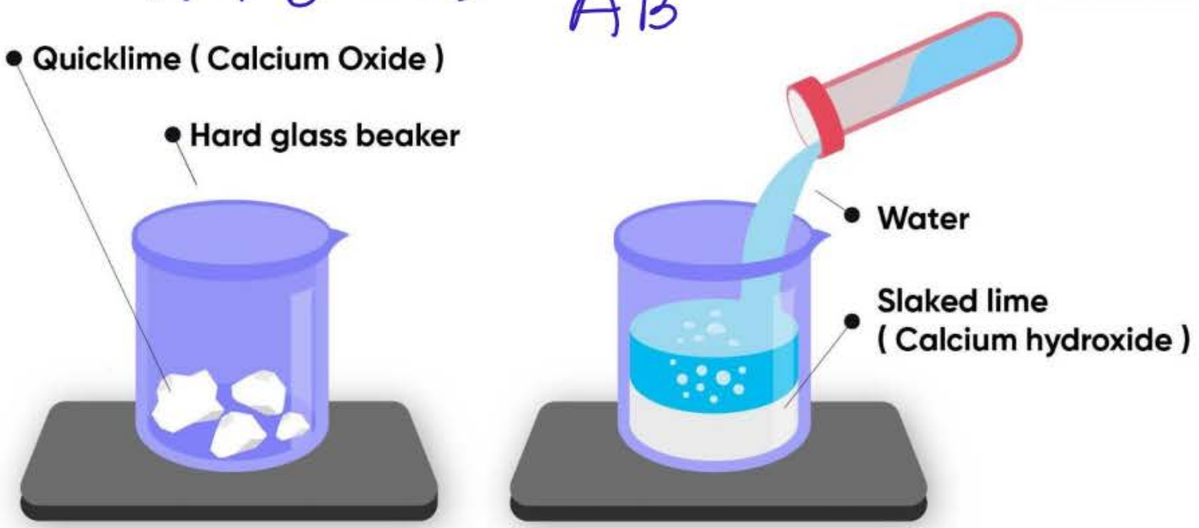
Example 1

Production of Slaked Lime बुझा हुआ चूना का उत्पादन

Calcium Oxide (Quick Lime) reacts with Water to produce Calcium Hydroxide (Slaked Lime) and Heat कैल्शियम ऑक्साइड (बुझा हुआ चूना) जल के साथ अभिक्रिया करके कैल्शियम हाइड्रॉक्साइड (बुझा हुआ चूना) और ऊष्मा उत्पन्न करता है

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

$$A + B \longrightarrow AB$$



1.2.1 Combination Reaction

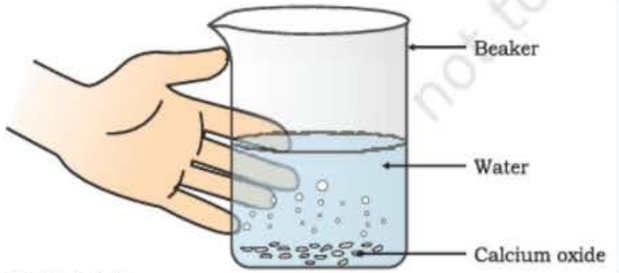


Figure 1.3
Formation of slaked lime by the reaction of calcium oxide with water

Activity 1.4

- Take a small amount of calcium oxide or quick lime in a beaker.
- Slowly add water to this.
- Touch the beaker as shown in Fig. 1.3.
- Do you feel any change in temperature?

Calcium oxide reacts vigorously with water to produce slaked lime (calcium hydroxide) releasing a large amount of heat.

$$\underset{\text{(Quick lime)}}{CaO(s)} + H_2O(l) \rightarrow \underset{\text{(Slaked lime)}}{Ca(OH)_2(aq)} + \text{Heat} \qquad (1.13)$$

In this reaction, calcium oxide and water combine to form a single product, calcium hydroxide. Such a reaction in which a single product is formed from two or more reactants is known as a combination reaction.

Calcium Hydroxide ($Ca(OH)_2$) is known as **slaked lime (बुझा हुआ चूना .)**.

$$CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq)$$

Combination

$$Ca(OH)_2(aq) + CO_2(g) \longrightarrow CaCO_3(s) + H_2O(l)$$

पानी सफेद → milky.

Calciyumhydroxide (Lime water) — पानी घुलन

Carbon dioxide

Calciumcarbonate (White ppt) (Makes limewater milky)

Water

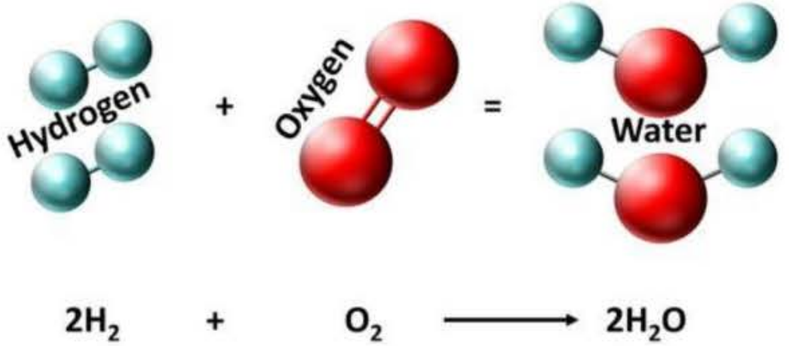
Do You Know?

A solution of slaked lime produced by the reaction 1.13 is used for whitewashing walls. Calcium hydroxide reacts slowly with the carbon dioxide in air to form a thin layer of calcium carbonate on the walls. Calcium carbonate is formed after two to three days of whitewashing and gives a shiny finish to the walls. It is interesting to note that the chemical formula for marble is also $CaCO_3$.

$$\underset{\text{(Calcium hydroxide)}}{Ca(OH)_2(aq)} + CO_2(g) \rightarrow \underset{\text{(Calcium carbonate)}}{CaCO_3(s)} + H_2O(l) \qquad (1.14)$$

Example

- कोयले का जलना burning of coal :- $C(s) + O_2(g) \rightarrow CO_2(g)$ ✓
- जल का बनना formation of water :- $2H_2(g) + O_2(g) \rightarrow H_2O(l)$ ✓
- सल्फर डाइऑक्साइड का बनना formation of sulfur dioxide :- $S(s) + O_2(g) \rightarrow SO_2(g)$ ✓
- जंग का लगना (फेरस ऑक्साइड का बनना) Rusting (formation of ferrous oxide) :- $4Fe + 3O_2 + 6H_2O \rightarrow 4Fe(OH)_3$.



05 वायु की उपस्थिति में मैग्नीशियम को जलाने पर मैग्नीशियम ऑक्साइड बनता है। इनमें शामिल अभिक्रिया के प्रकार का चयन कीजिए।

Magnesium oxide is formed when magnesium is burnt in the presence of air. Select the type of reaction involved.

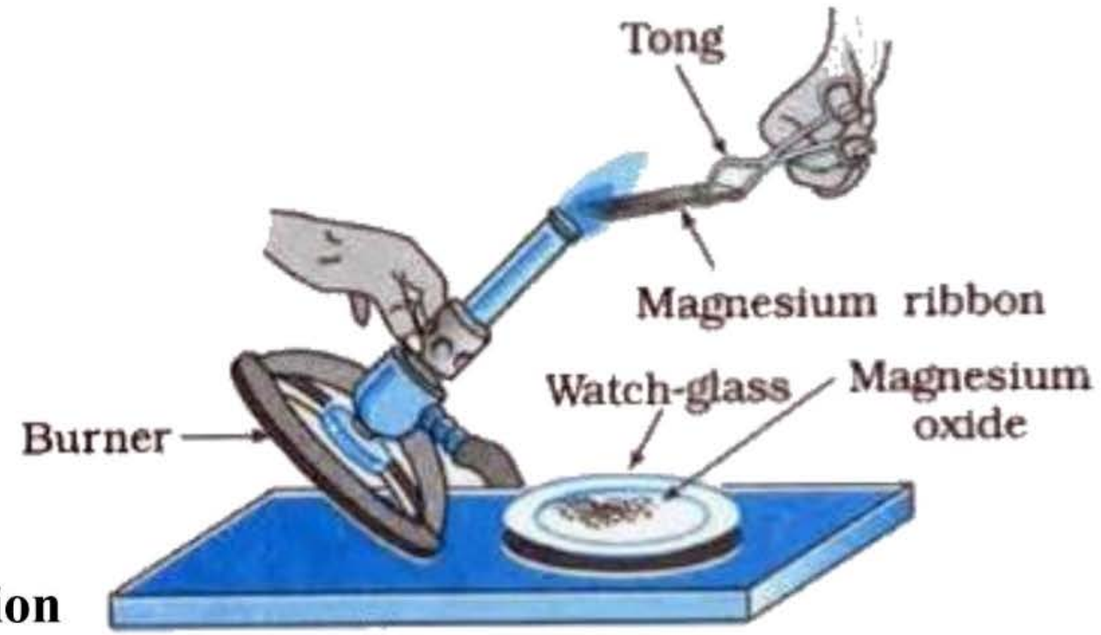
Combination

(a) ऑक्सीकरण अभिक्रिया / Oxidation Reaction

(B) विस्थापन अभिक्रिया / Displacement Reaction

(C) अपचयन अभिक्रिया / Reduction Reaction

(D) द्वि-विस्थापन अभिक्रिया / Double Displacement Reaction



Magnesium + Oxygen Gas

$$Mg_{(s)} + O_{2(g)} \rightarrow MgO_{(s)}$$


Potassium
Yellow
Sodium
Lithium
Calcium
Copper

05 निम्न में से कौन सा संयोजन अभिक्रिया का उदाहरण है?

Which of the following is an example of combination reaction?

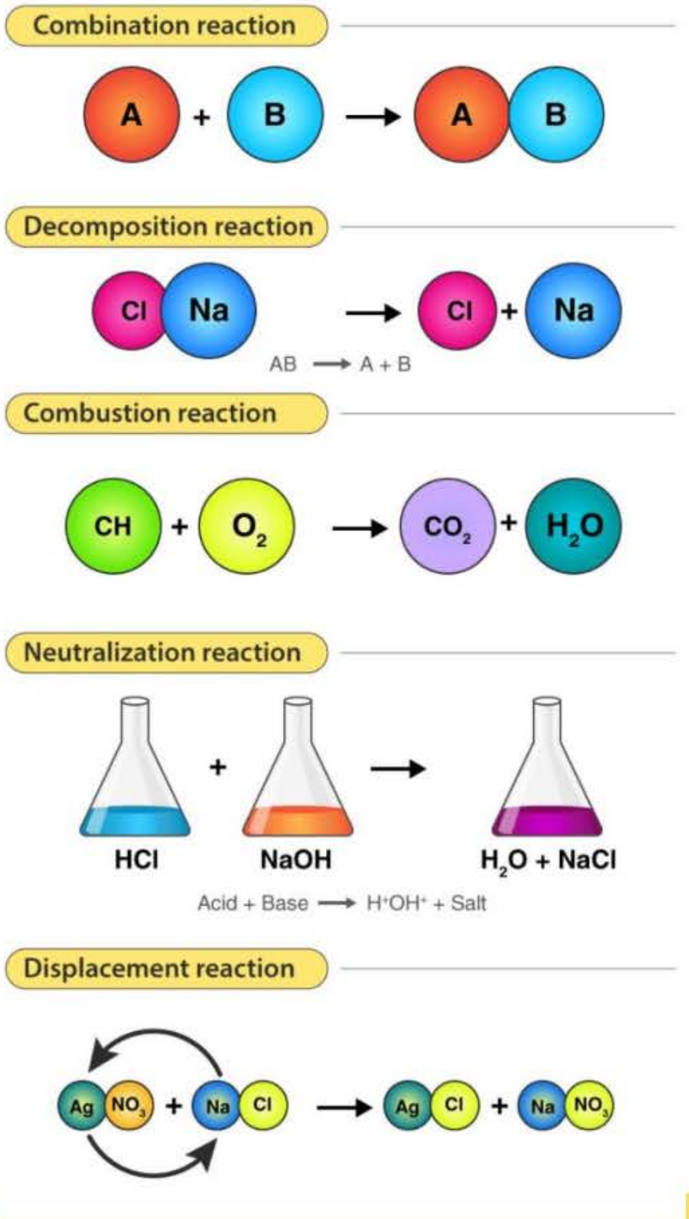
Single Product

(a) $MgCl_2 + Na \longrightarrow 2NaCl + Mg$ ✗

(b) $2NaCl \longrightarrow 2Na + Cl_2$ ✗

(c) $N_2 + 3H_2 \longrightarrow 2NH_3$ (✓)

(d) $ZnCO_3 \longrightarrow ZnO + CO_2$



06

क्या होता है जब अनबुझा चूना, जल के साथ प्रबलता से अभिक्रिया करता है? "चमकी"

What Happens When Quicklime Reacts Strongly With Water?

$CaO + H_2O \longrightarrow Ca(OH)_2$ + Heat निर्मित.

(A) ऊष्माक्षेपी अभिक्रिया / Exothermic Reaction – Combination

(B) विस्थापन अभिक्रिया / Displacement Reaction

(C) द्विविस्थापन अभिक्रिया / Double Displacement Reaction

(D) वियोजन अभिक्रिया / Decomposition Reaction

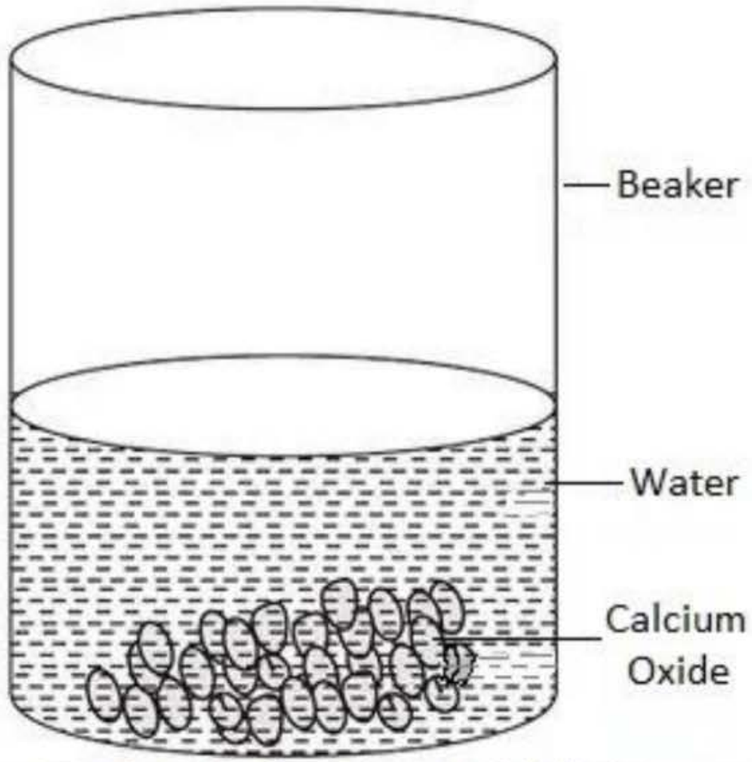


Fig: Action of water on quick lime

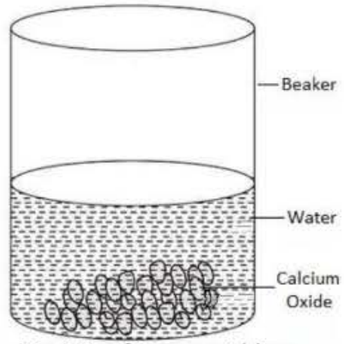


Fig: Action of water on quick lime

Calcium oxide reacts vigorously with water to produce slaked lime (calcium hydroxide) releasing a large amount of heat.

$$\underset{\text{(Quick lime)}}{CaO(s)} + H_2O(l) \rightarrow \underset{\text{(Slaked lime)}}{Ca(OH)_2(aq)} + \text{Heat} \qquad (1.13)$$

In this reaction, calcium oxide and water combine to form a single product, calcium hydroxide. Such a reaction in which a single product is formed from two or more reactants is known as a combination reaction.

07

निम्न में से कौन सा संयोजन अभिक्रिया का उदाहरण है?

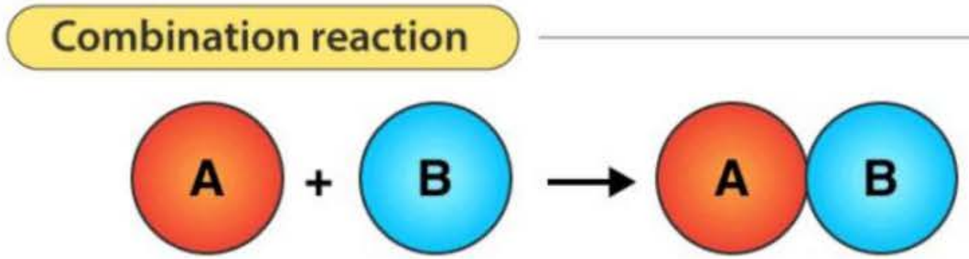
Which of the following is an example of combination reaction?

(a) $2H_2(g) + O_2(g) \rightarrow 2H_2O\ (I)$

(b) $HCL(aq) + NaOH(aq) \rightarrow NaCL\ (aq) + H_2O\ (I)$

(c) $2HCl(aq) + 2Na(s) \rightarrow N_2Cl\ (aq) + H_2(g)$

(d) $CH_4(g) + 2O_2(g) \rightarrow CO_2\ (g) + 2H_2O\ (g)$



Let us discuss some more examples of combination reactions.

(i) Burning of coal

$$C(s) + O_2(g) \rightarrow CO_2(g) \qquad (1.15)$$

(ii) Formation of water from $H_2(g)$ and $O_2(g)$

$$2H_2(g) + O_2(g) \rightarrow 2H_2O(l) \qquad (1.16)$$

In simple language we can say that when two or more substances (elements or compounds) combine to form a single product, the reactions are called combination reactions.

1.2.1 Combination Reaction

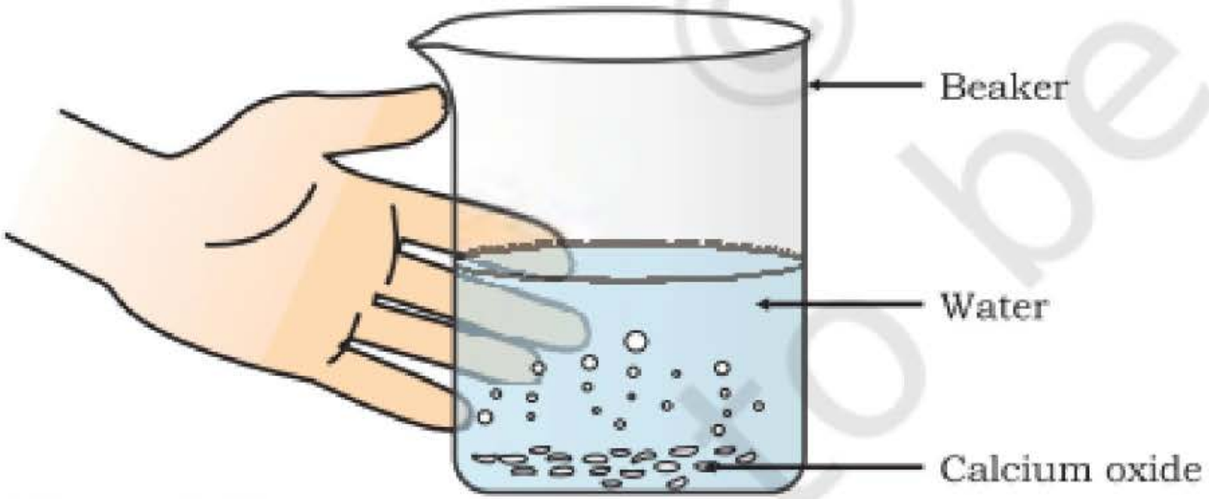


Figure 1.3
Formation of slaked lime by the reaction of calcium oxide with water

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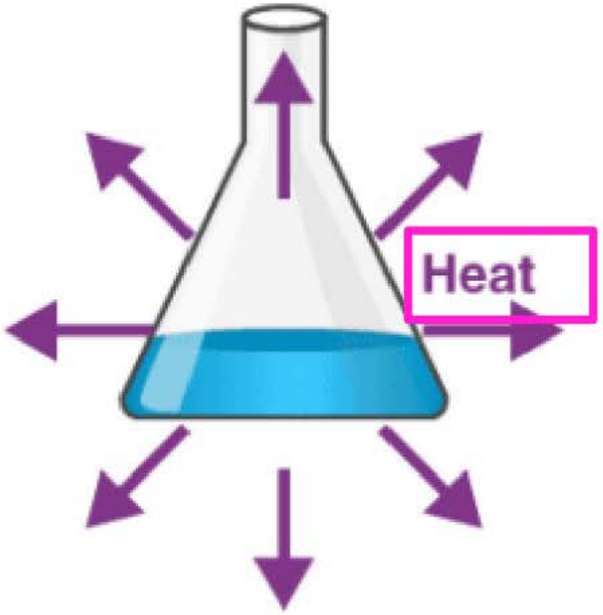
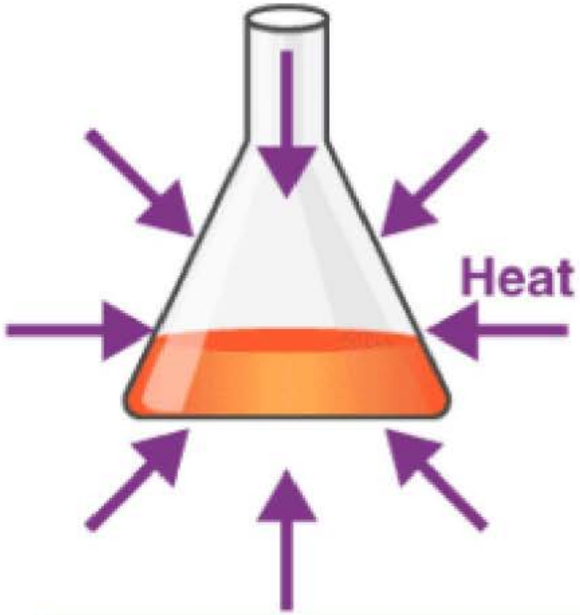
ऊष्मा के आधार पर रासायनिक अभिक्रिया के प्रकार
Types Of Chemical Reactions Based On Heat



ऊष्माक्षेपी अभिक्रियाएँ
Exothermic Reactions

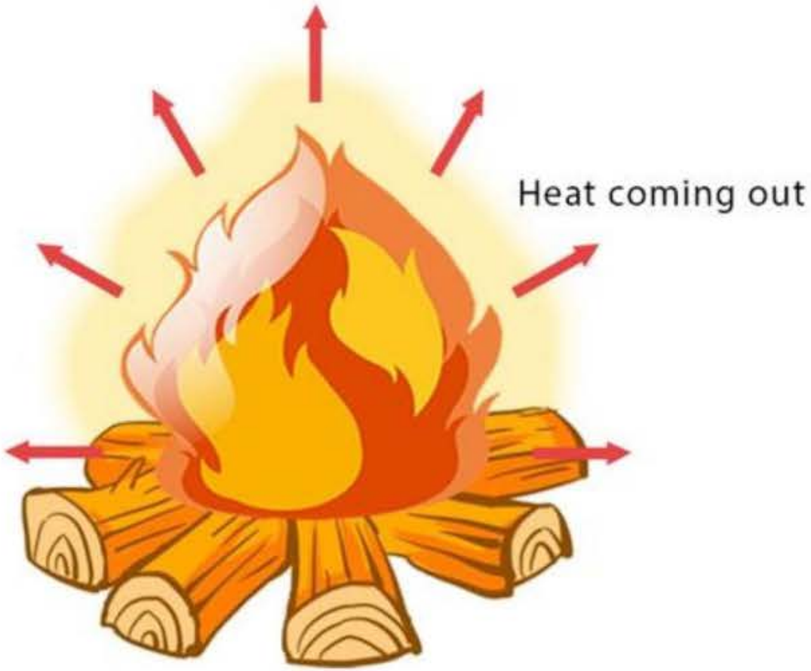


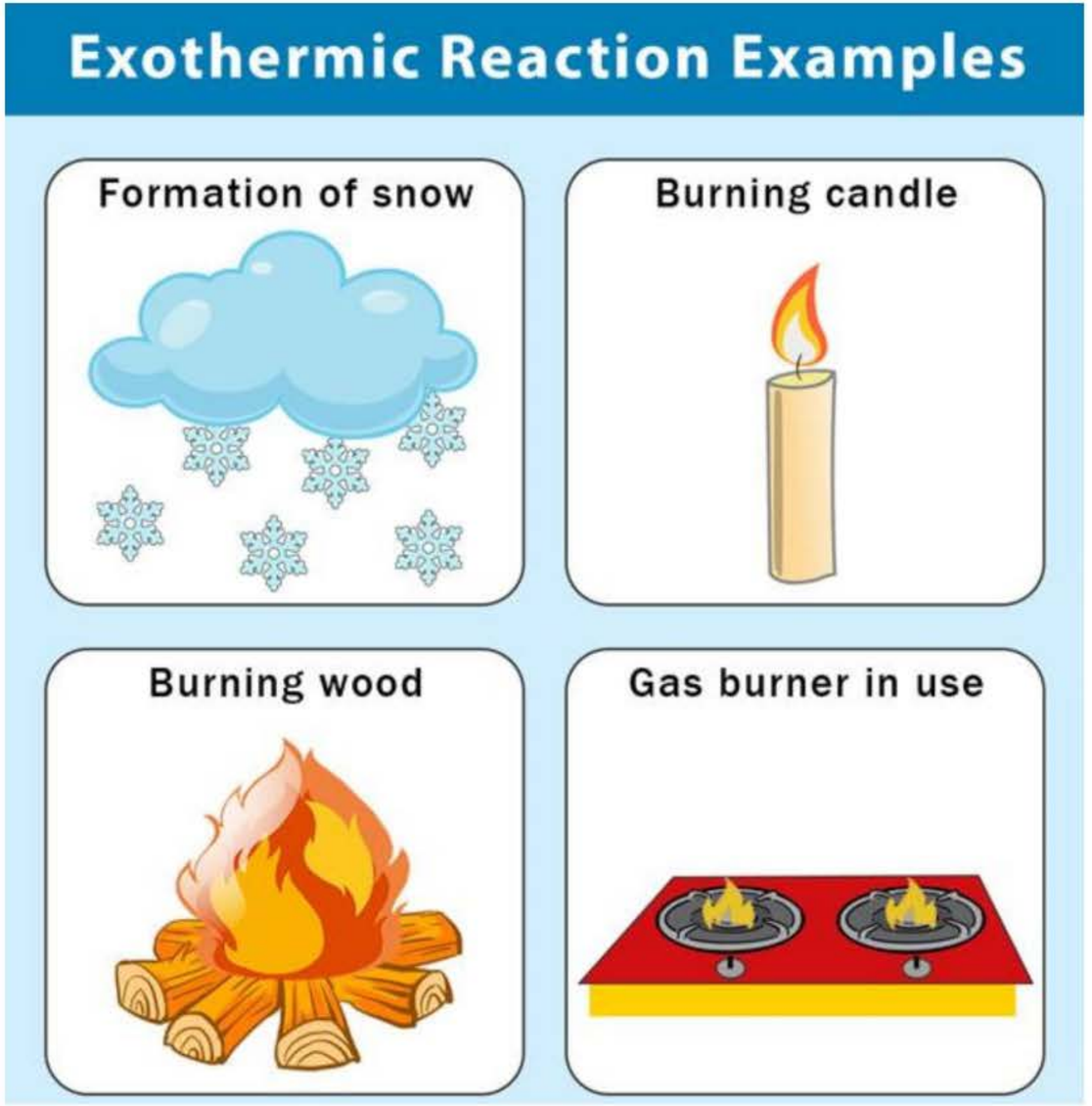
ऊष्माशोषी अभिक्रियाएँ
Endothermic Reactions

ऊष्माक्षेपी अभिक्रियाएँ Exothermic Reactions

वे अभिक्रियाएँ जिसमें अभिक्रिया के दौरान ऊष्मा निकलती है, ऊष्माक्षेपी अभिक्रिया कहलाती हैं

Those reactions in which heat is evolved during the reaction are called exothermic reactions

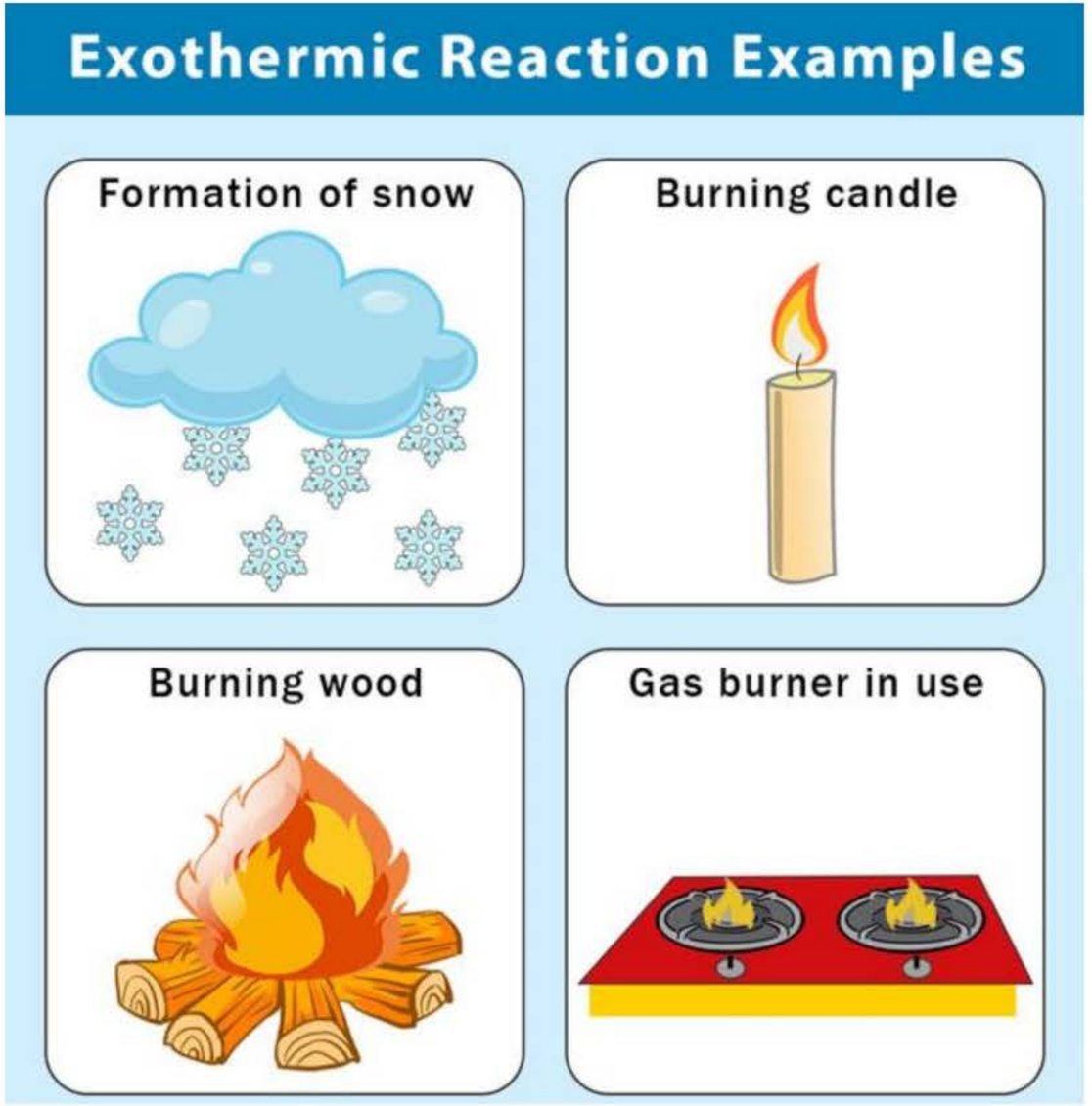




ऊष्माक्षेपी अभिक्रियाएँ Exothermic Reactions

Combination

- $2\ Na\ (s) + Cl_2\ (g) \rightarrow 2\ NaCl\ (s) + heat$
- $CaO\ (s) + H_2O\ (l) \rightarrow Ca(OH)_2\ (aq.) + heat$
- $CaCl_2\ (s) + H_2O\ (l) \rightarrow CaO\ (s) + 2\ HCl\ (aq.) + heat$
- $2\ H_2\ (g) + O_2\ (g) \rightarrow 2\ H_2O\ (l) + heat$
- $N_2\ (g) + 3\ H_2\ (g) \rightarrow 2\ NH_3\ (g) + heat$



ऊष्माक्षेपी अभिक्रियाएँ Exothermic Reactions

Cell → mitochondria

glucose + Oxygen ——

36-38 ATP

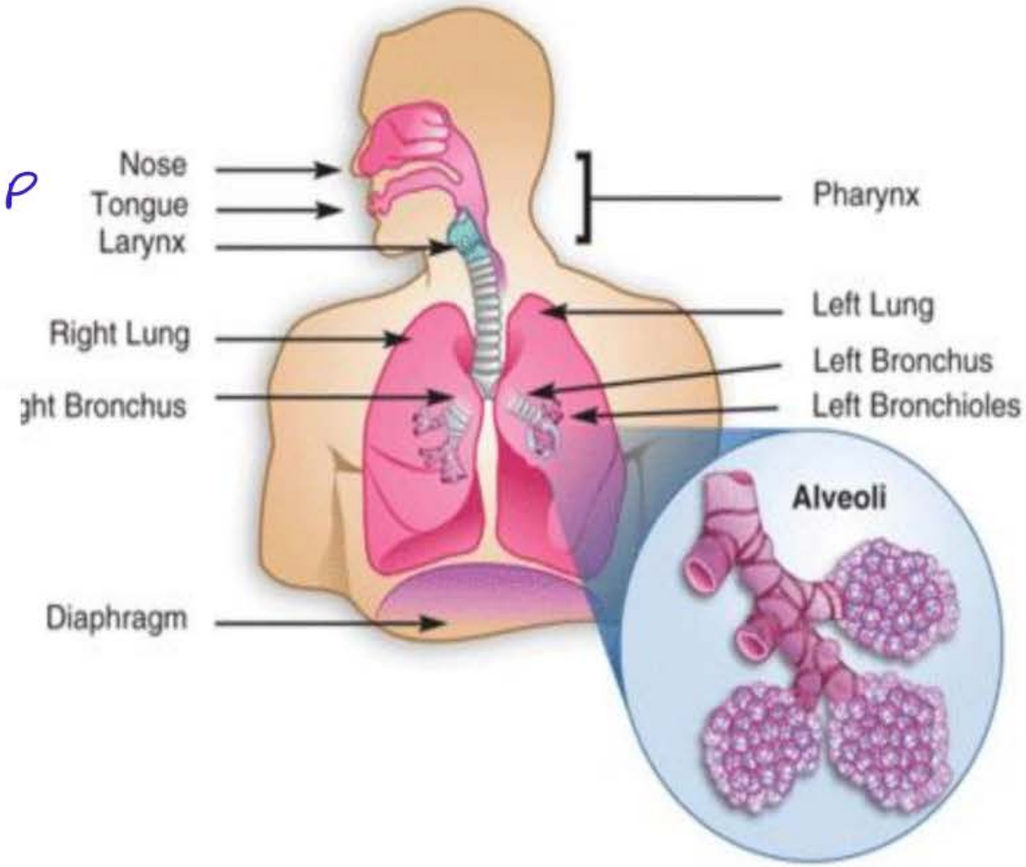
$$C_6H_{12}O_6\,(s) + 6\,O_2\,(g) \rightarrow CO_2\,(g) + H_2O\,(l) + \text{energy}$$

↳ Lungs

We all know that we need energy to stay alive. We get this energy from the food we eat. During digestion, food is broken down into simpler substances. For example, rice, potatoes and bread contain carbohydrates. These carbohydrates are broken down to form glucose. This glucose combines with oxygen in the cells of our body and provides energy. The special name of this reaction is respiration, the process of which you will study in Chapter 6.

$$C_6H_{12}O_6(aq) + 6O_2(aq) \rightarrow 6CO_2(aq) + 6H_2O(l) + \text{energy} \qquad (1.18)$$
(Glucose)

Respiration श्वसन



08 वनस्पति पदार्थों के खाद में अपघटन की अभिक्रिया _____ का एक उदाहरण है।

Energy देती (Endothermic)

The decomposition reaction of plant matter into manure is an example of _____.

विघटन

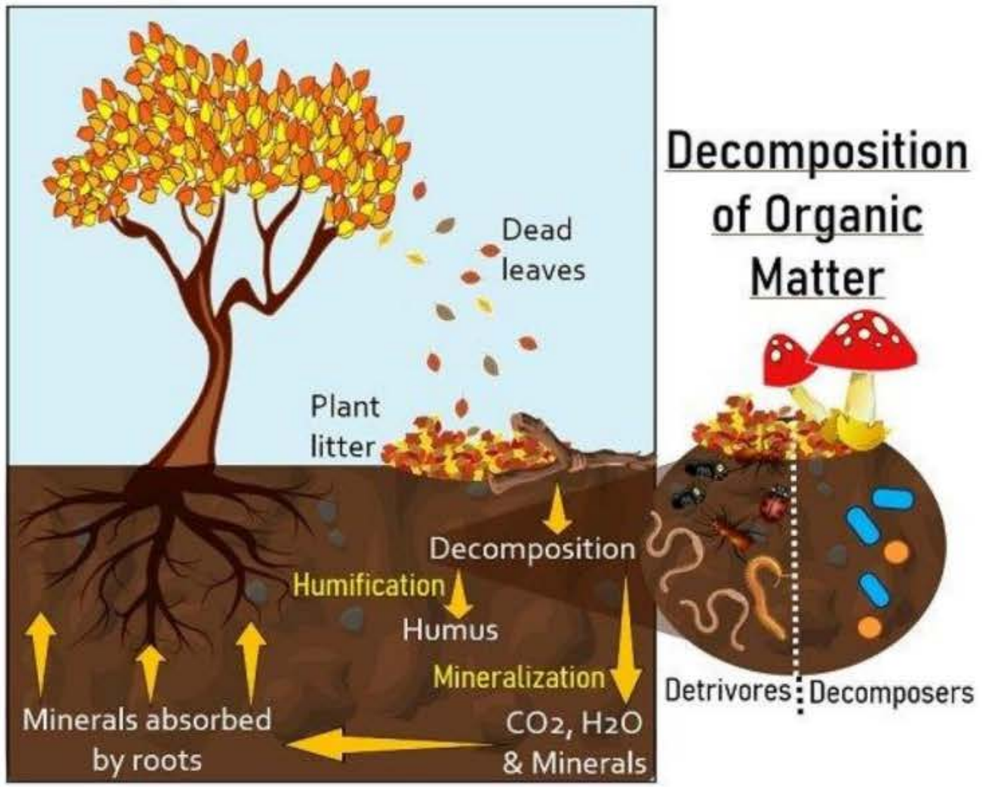
अपवाद

(A) ऊष्माक्षेपी / Exothermic

(B) ऊष्माशोषी / Endothermic

(C) विस्थापन / Displacement

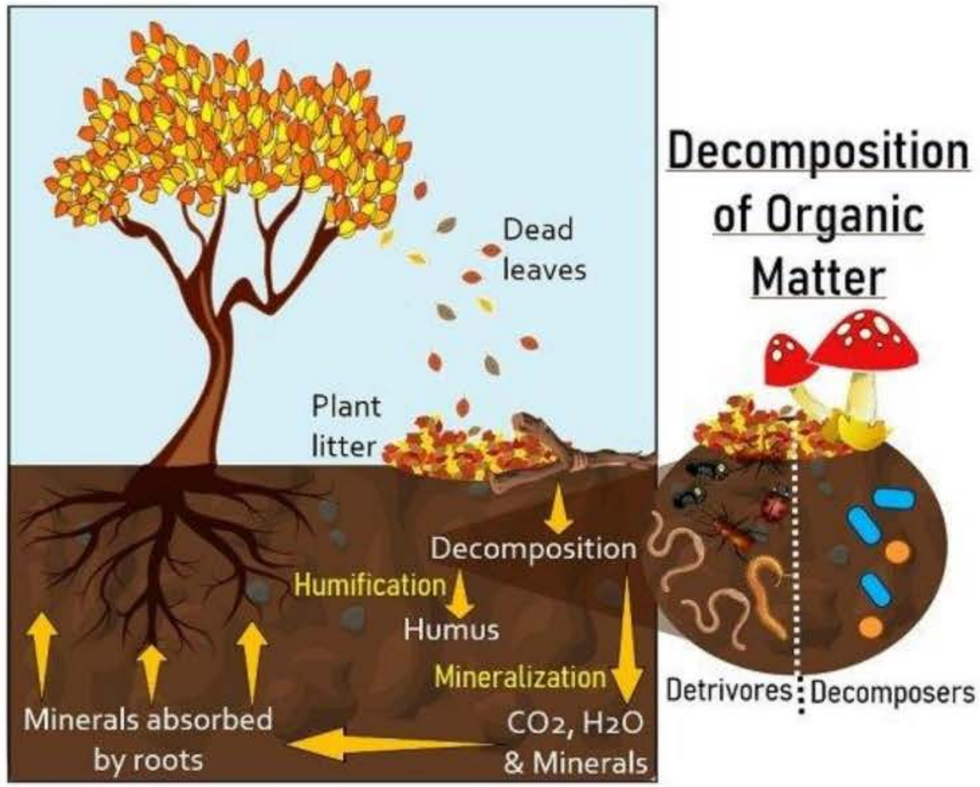
(D) दोहरा विस्थापन / Double Displacement



(iii) The decomposition of vegetable matter into compost is also an example of an exothermic reaction.

Clear (अपवाद)

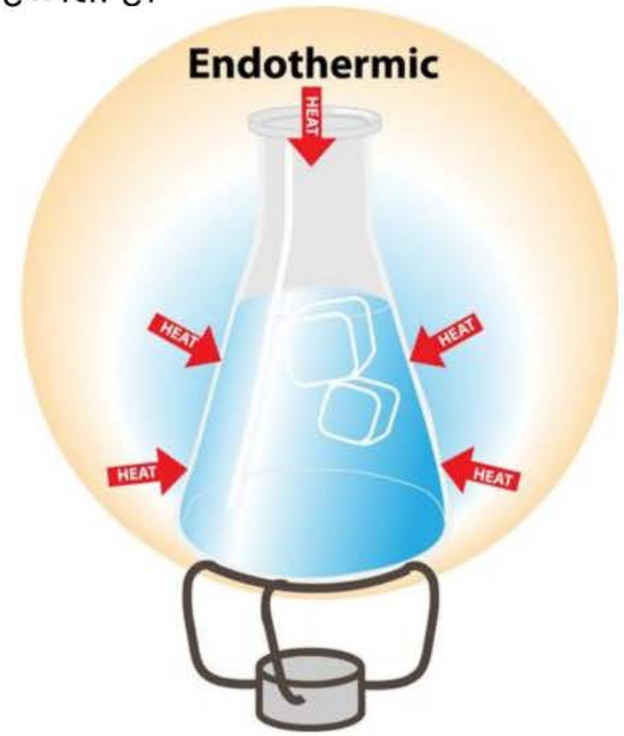
NCERT

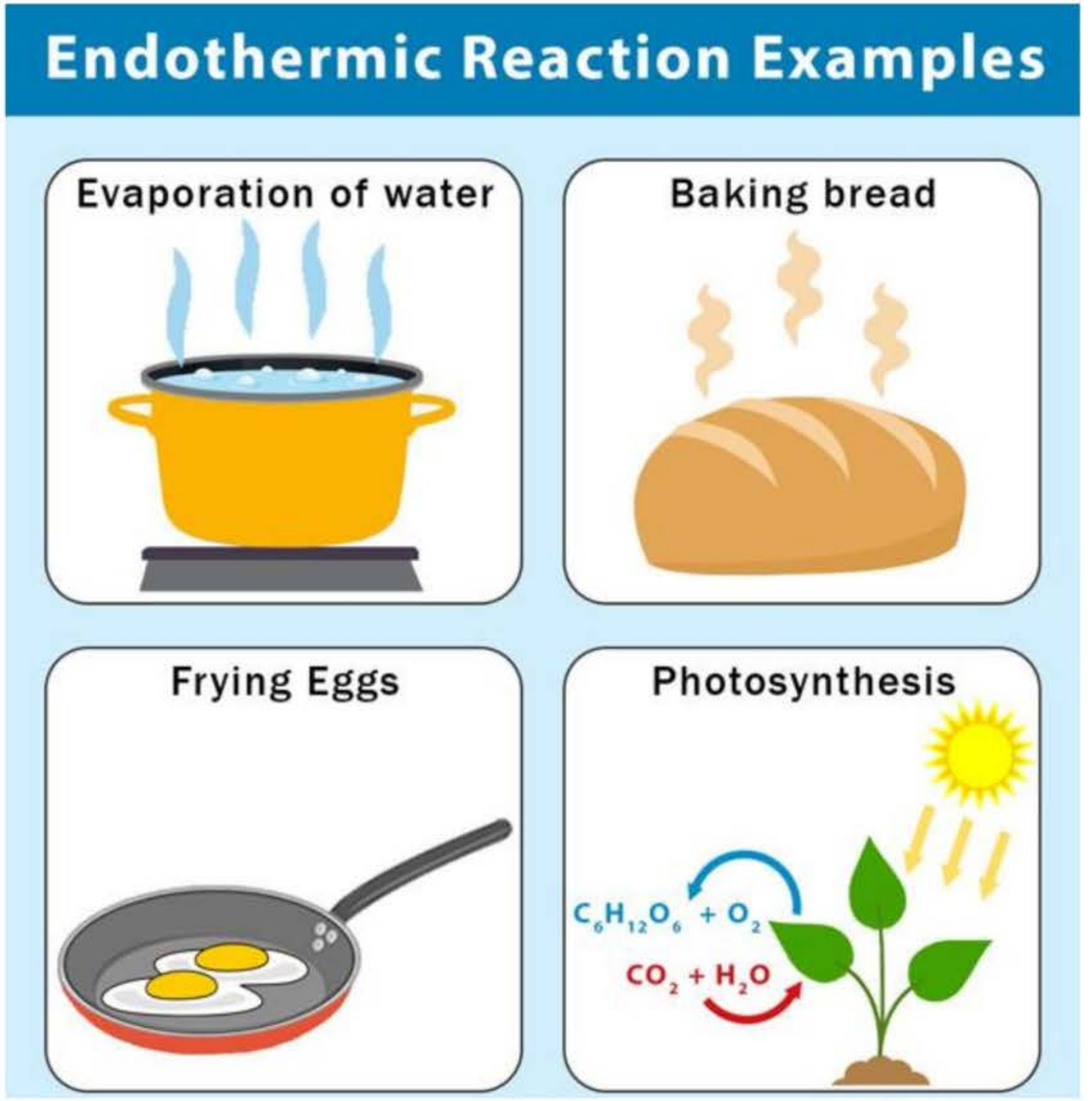


ऊष्माशोषी अभिक्रियाएँ Endothermic Reactions

Reactions in which energy is absorbed/utilized are called endothermic reactions.

वे अभिक्रियाएँ जिनमें ऊर्जा अवशोषित/उपयोग की जाती है, ऊष्माशोषी अभिक्रियाएँ कहलाती हैं।



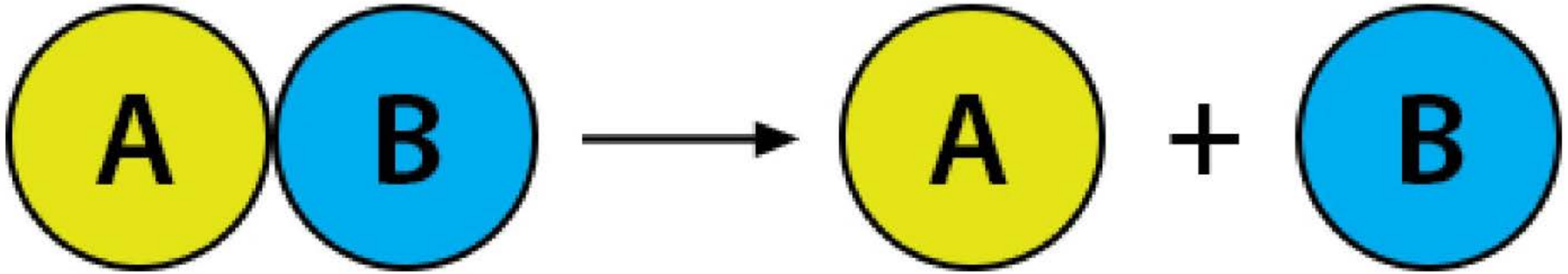


वियोजन या अपघटन अभिक्रिया
Decomposition Reaction

mmI.

•वे अभिक्रियाएँ जिनमें एकल अभिकारक वियोजित विघटित होकर दो या अधिक उत्पादों का निर्माण करता है विघटन अभिक्रियाएँ कहलाती है

•The Reactions In Which **A Single Reactant** Disintegrates To Form **Two Or More** Products Are Called **Decomposition Reactions**.



Reactant Product

वियोजन या अपघटन अभिक्रिया

Decomposition Reaction

↓

Energy → देनी

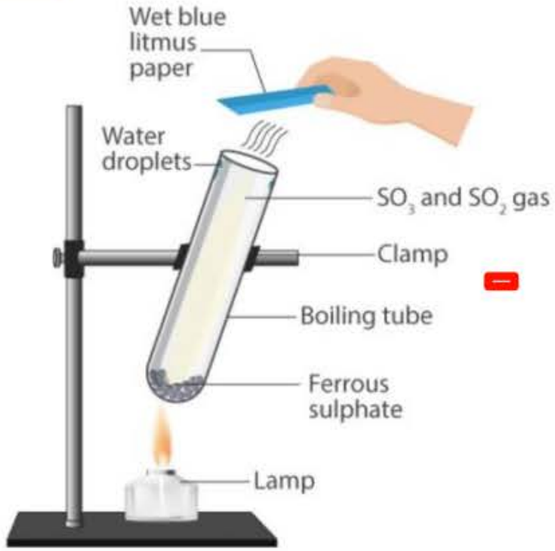
Heat →

Endothermic

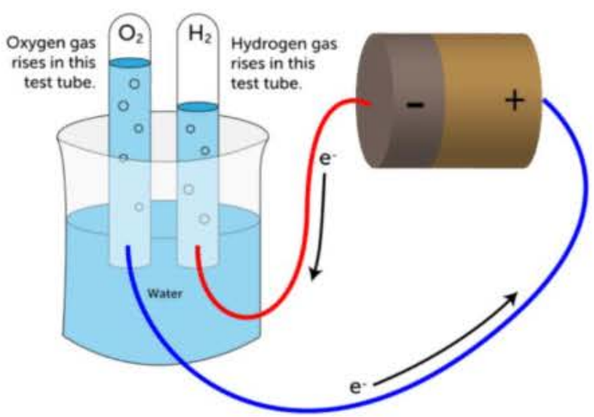
lysis → Break down

DECOPOSITION REACTION

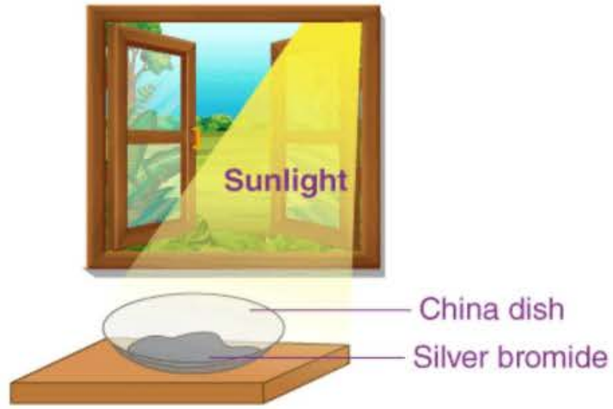
Thermolysis
ऊष्मीय वियोजन



Electroysis
विद्युत वियोजन



Photolysis
प्रकाशीय वियोजन



09

तापन द्वारा की जाने वाली अपघटन अभिक्रिया क्या कहलाती है?

What Is The Decomposition Reaction Done By Heating Called?

(a) विद्युत अपघटन / Galvanic Isolation

(B) उष्माक्षेपी अभिक्रिया / Exothermic Reaction

(C) ऊष्मीय अपघटन / Thermal Decomposition

(D) प्रकाश रासायनिक अपघटन / Photochemical Decomposition

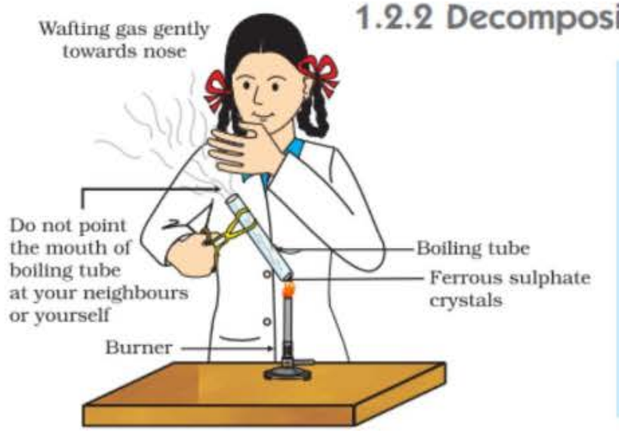


Figure 1.4
Correct way of heating the boiling tube containing crystals of ferrous sulphate and of smelling the odour

1.2.2 Decomposition Reaction

Activity 1.5

- Take about 2 g ferrous sulphate crystals in a dry boiling tube.
- Note the colour of the ferrous sulphate crystals.
- Heat the boiling tube over the flame of a burner or spirit lamp as shown in Fig. 1.4.
- Observe the colour of the crystals after heating.

Have you noticed that the green colour of the ferrous sulphate crystals has changed? You can also smell the characteristic odour of burning sulphur.

Green colour

$$2FeSO_4(s) \xrightarrow{\text{Heat}} Fe_2O_3(s) + SO_2(g) + SO_3(g) \quad (1.19)$$

(Ferrous sulphate) (Ferric oxide) Brown Gas

mmI

In this reaction you can observe that a single reactant breaks down to give simpler products. This is a decomposition reaction. Ferrous sulphate crystals ($FeSO_4 . 7H_2O$) lose water when heated and the colour of the crystals changes. It then decomposes to ferric oxide (Fe_2O_3), sulphur dioxide (SO_2) and sulphur trioxide (SO_3). Ferric oxide is a solid, while SO_2 and SO_3 are gases.

Decomposition of calcium carbonate to calcium oxide and carbon dioxide on heating is an important decomposition reaction used in various industries. Calcium oxide is called lime or quick lime. It has many uses – one is in the manufacture of cement. When a decomposition reaction is carried out by heating, it is called thermal decomposition.

$$CaCO_3(s) \xrightarrow{\text{Heat}} CaO(s) + CO_2(g) \quad (1.20)$$

(Limestone) (Quick lime)

Decomposition Reaction Examples

$$2\,Fe(OH)_3 \xrightarrow{\Delta} Fe_2O_3 + 3\,H_2O$$

Heat ↙

Ferric hydroxide — Ferric oxide — Water

$$2\,H_2O \xrightarrow{\text{Elec.}} 2\,H_2 + O_2$$

Water — Hydrogen — Oxygen

$$2\,AgBr \xrightarrow{h\nu} 2\,Ag + Br_2$$

Silver bromide — Silver — Bromine

$$H_2CO_3 \longrightarrow CO_2 + H_2O$$

Carbonic acid — Carbon dioxide — Water

$$CaCO_3 \xrightarrow{\Delta} CaO + CO_2$$

(Calcium Carbonate) (Calcium Oxide) (Carbon Dioxide)

$$Na_2CO_3 \xrightarrow{\Delta} Na_2O + CO_2$$

(Sodium Carbonate) (Sodium Oxide) (Carbon Dioxide)

10 पराबैंगनी विकिरण की उपस्थिति में, सिल्वर क्लोराइड, सिल्वर और क्लोरीन गैस में बदल जाता है। यह _____ का उदाहरण है।

In the presence of ultraviolet radiation, silver chloride transforms into silver and chlorine gas. This is an example of _____.

(A) द्वि-विस्थापन अभिक्रिया / Double Displacement Reaction

(B) ऊष्मीय अपघटन अभिक्रिया / Thermal Decomposition Reaction

(C) रेडॉक्स अभिक्रिया / Redox Reaction

(D) प्रकाश-अपघट्य अपघटन अभिक्रिया / Photolytic Decomposition Reaction

मजा

Activity 1.8

- Take about 2 g silver chloride in a china dish.
- What is its colour?
- Place this china dish in sunlight for some time (Fig. 1.7).
- Observe the colour of the silver chloride after some time.

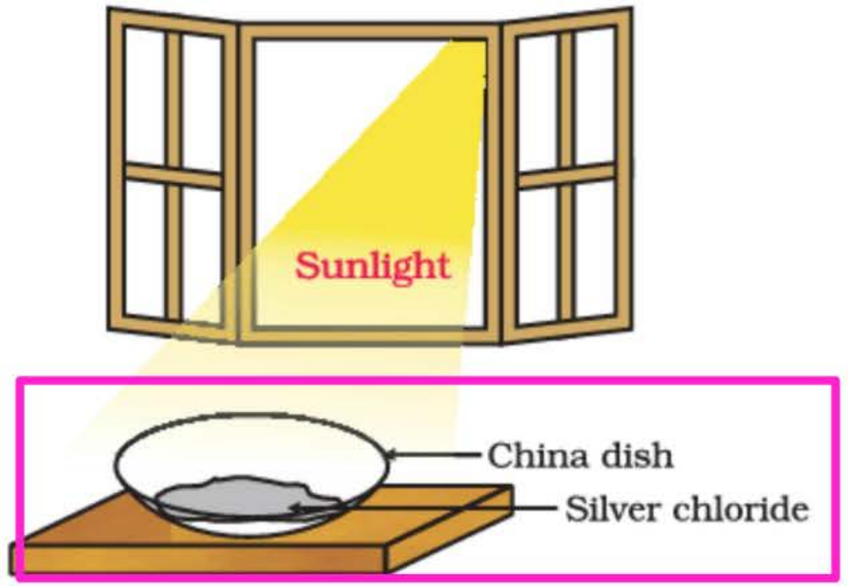


Figure 1.7
Silver chloride turns grey in sunlight to form silver metal

You will see that white silver chloride turns grey in sunlight. This is due to the decomposition of silver chloride into silver and chlorine by light.

$$2AgCl(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Cl_2(g) \qquad (1.22)$$

↓ Green Colour

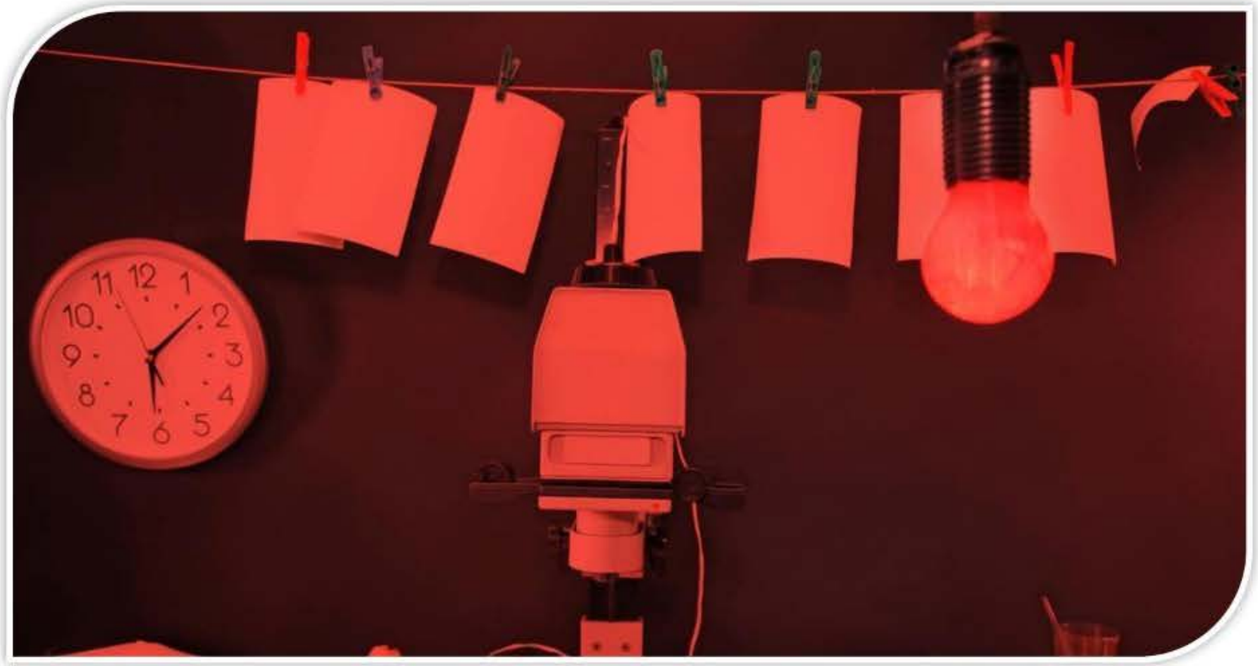
Chemical Reactions (रासायनिक अभिक्रियाएँ)

$$2AgCl(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Cl_2(g)$$

White → Grey

$$2AgBr(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Br_2(g)$$

Light yellow → Grey



11

निम्न में से कौन सा 'वैद्युत अपघटनी अपघटन अभिक्रिया' का उदाहरण है?

Which of the following is an example of 'electrolytic decomposition reaction'?

(A) $ZnCO_3 \longrightarrow ZnO + CO_2$

(B) $2Agbr \longrightarrow 2Ag + Br_2$

(C) $2H_2O \longrightarrow 2H_2 + O_2$

(D) $2KClO_3 \longrightarrow 2kCl + 3O_2$

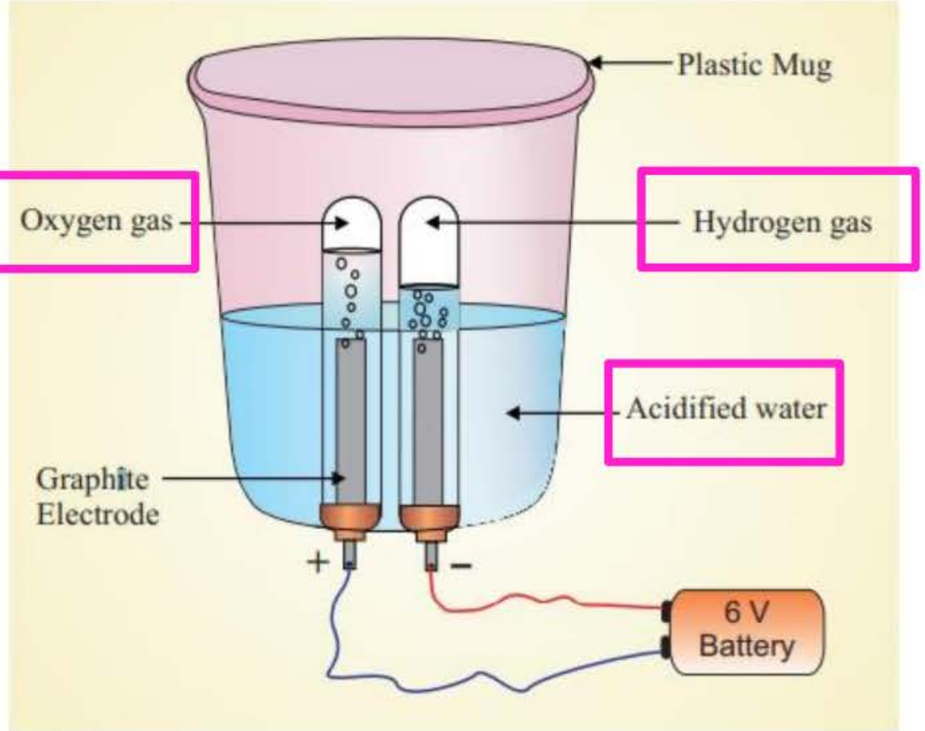


Fig. 4.4: *Electrolysis of water*

12

दी गई रासयनिक अभिक्रिया में फरेस सल्फेट का रंग कैसा होता है?

What is the color of ferrous sulphate in the given chemical reaction?

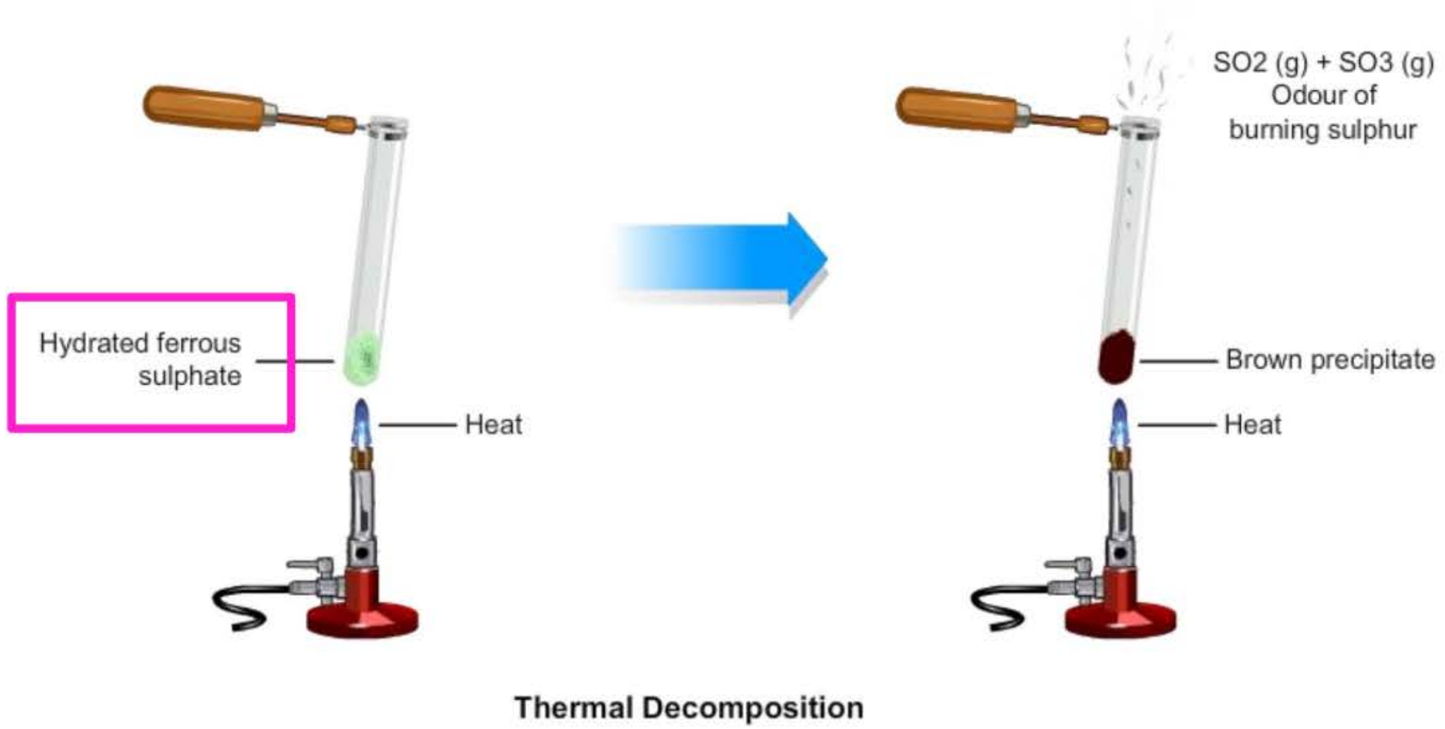
$$2FeSO_4(s) \longrightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$$

(A) हरा / Green

(B) नीला / Blue

(C) लाल / Red

(D) पीला / Yellow



Thermal Decomposition

$$2FeSO_4(s) \xrightarrow{\text{Heat}} Fe_2O_3(s) + SO_2(g) + SO_3(g) \quad (1.19)$$

(Ferrous sulphate) (Ferric oxide)

In this reaction you can observe that a single reactant breaks down to give simpler products. This is a decomposition reaction. Ferrous sulphate crystals ($FeSO_4$, $7H_2O$) lose water when heated and the colour of the crystals changes. It then decomposes to ferric oxide (Fe_2O_3), sulphur dioxide (SO_2) and sulphur trioxide (SO_3). Ferric oxide is a solid, while SO_2 and SO_3 are gases.

Chemical Reactions (रासायनिक अभिक्रियाएँ)

Common Name (व्यापारिक नाम)	रासायनिक नाम (Chemical Name)	रासायनिक सूत्र (Formula)
हरा कपीस / Green Vitriol	फेरस सल्फेट (Ferrous Sulphate)	$FeSO_4 \cdot 7H_2O$
नीला कपीस / Blue Vitriol	कॉपर सल्फेट (Copper Sulphate)	$CuSO_4 \cdot 5H_2O$
सफेद कपीस / White Vitriol	जिंक सल्फेट (Zinc Sulphate)	$ZnSO_4 \cdot 7H_2O$
शोरा / Saltpetre	पोटैशियम नाइट्रेट (Potassium Nitrate)	KNO_3
सेंधा नमक / Rock Salt	सोडियम क्लोराइड (Sodium Chloride)	$NaCl$
धौकनी / Nickel Vitriol	निकेल सल्फेट (Nickel Sulphate)	$NiSO_4 \cdot 7H_2O$
लाल थोथा / Red Vitriol	कोबाल्ट सल्फेट (Cobalt Sulphate)	$CoSO_4 \cdot 7H_2O$
बारूद का नमक / Chile Saltpetre	सोडियम नाइट्रेट (Sodium Nitrate)	$NaNO_3$
प्लास्टर ऑफ पेरिस / Plaster of Paris (POP)	कैल्शियम सल्फेट हेमीहाइड्रेट (Calcium Sulphate Hemihydrate)	$CaSO_4 \cdot \frac{1}{2}H_2O$

13

निम्नलिखित में से कौन सी अभिक्रिया, ऊष्माशोषी अभिक्रिया का एक उदाहरण है?

Which of the following reactions is an example of an Endothermic Reaction?

Acid + water ⟶ Heat

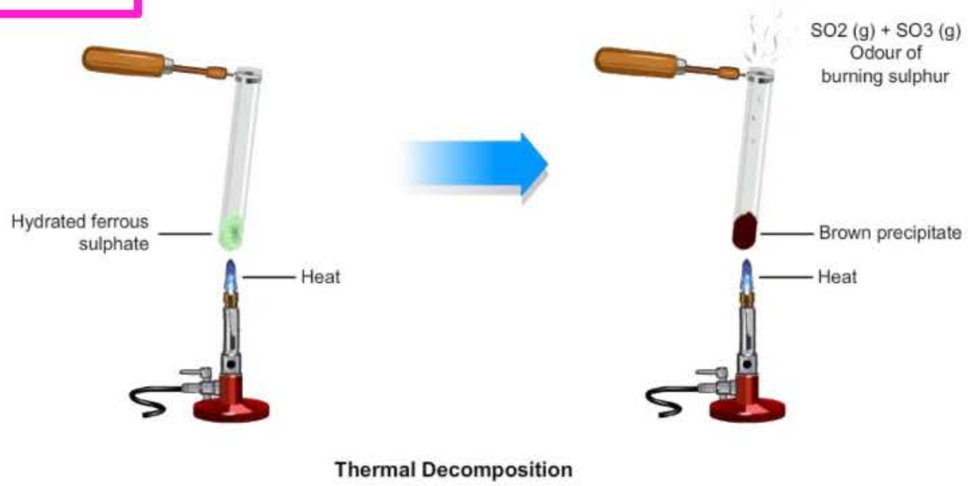
NaOH ↑

(A) पानी में सोडियम हाइड्रोक्साइड का घुलना / Dissolution Of Sodium Hydroxide In Water

(B) फेरस सल्फेट का अपघटन / Decomposition Of Ferrous Sulphate

(C) सल्फ्यूरिक एसिड का तनुकरण / Dilution Of Sulfuric Acid

(D) प्राकृतिक गैस का जलना / Natural Gas Burning



Thermal Decomposition

re 1.4
ect way of heating
oiling tube
ining crystals
rous sulphate
of smelling the

Have you noticed that the green colour of the ferrous sulphate crystals has changed? You can also smell the characteristic odour of burning sulphur.

$$\underset{\text{(Ferrous sulphate)}}{2FeSO_4(s)} \xrightarrow{\text{Heat}} \underset{\text{(Ferric oxide)}}{Fe_2O_3(s)} + SO_2(g) + SO_3(g) \qquad (1.19)$$

In this reaction you can observe that a single reactant breaks down to give simpler products. This is a decomposition reaction. Ferrous sulphate crystals ($FeSO_4$, $7H_2O$) lose water when heated and the colour of the crystals changes. It then decomposes to ferric oxide (Fe_2O_3), sulphur dioxide (SO_2) and sulphur trioxide (SO_3). Ferric oxide is a solid, while SO_2 and SO_3 are gases.

Decomposition of calcium carbonate to calcium oxide and carbon dioxide on heating is an important decomposition reaction used in various industries. Calcium oxide is called lime or quick lime. It has many uses – one is in the manufacture of cement. When a decomposition reaction is carried out by heating, it is called thermal decomposition.

$$\underset{\text{(Limestone)}}{CaCO_3(s)} \xrightarrow{\text{Heat}} \underset{\text{(Quick lime)}}{CaO(s)} + CO_2(g) \qquad (1.20)$$

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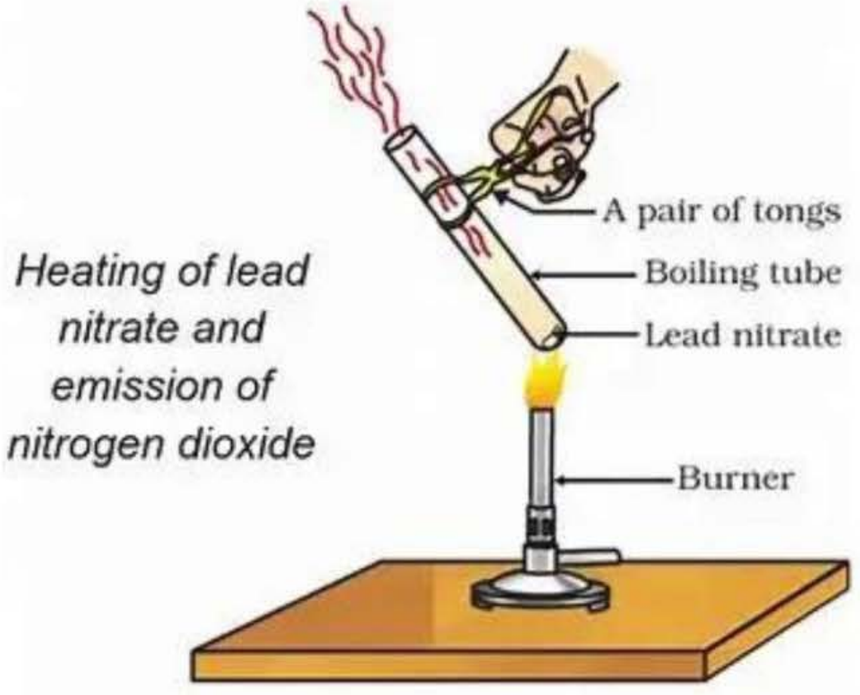
Reddish Brown

$$2Pb(NO_3)_2(s) \xrightarrow{\text{Heat}} 2PbO(s) + 4NO_2(g) + O_2(g)$$

(Lead nitrate) (Lead oxide) (Nitrogen dioxide) (Oxygen)



Heating of lead nitrate and emission of nitrogen dioxide

विस्थापन अभिक्रिया Displacement Reaction

आप लोगो (Reaction)

•ऐसी अभिक्रियाएँ जिसमें अधिक अभिक्रियाशील पदार्थ कम अभिक्रियाशील पदार्थ को उसके यौगिक से अलग कर देता है विस्थापन अभिक्रिया कहलाती हैं

•Reactions In Which **A More Reactive Substance Removes** A Less Reactive Substance From Its Compound Are Called **Displacement Reactions.**

Why does the iron nail become brownish in colour and the blue colour of copper sulphate solution fades?

The following chemical reaction takes place in this Activity–

$$Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s) \quad (1.24)$$

(Copper sulphate) (Iron sulphate)

In this reaction, iron has displaced or removed another element, copper, from copper sulphate solution. This reaction is known as displacement reaction.

Other examples of displacement reactions are

$$Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s) \quad (1.25)$$

(Copper sulphate) (Zinc sulphate)

$$Pb(s) + CuCl_2(aq) \rightarrow PbCl_2(aq) + Cu(s) \quad (1.26)$$

(Copper chloride) (Lead chloride)

Zinc and lead are more reactive elements than copper. They displace copper from its compounds.

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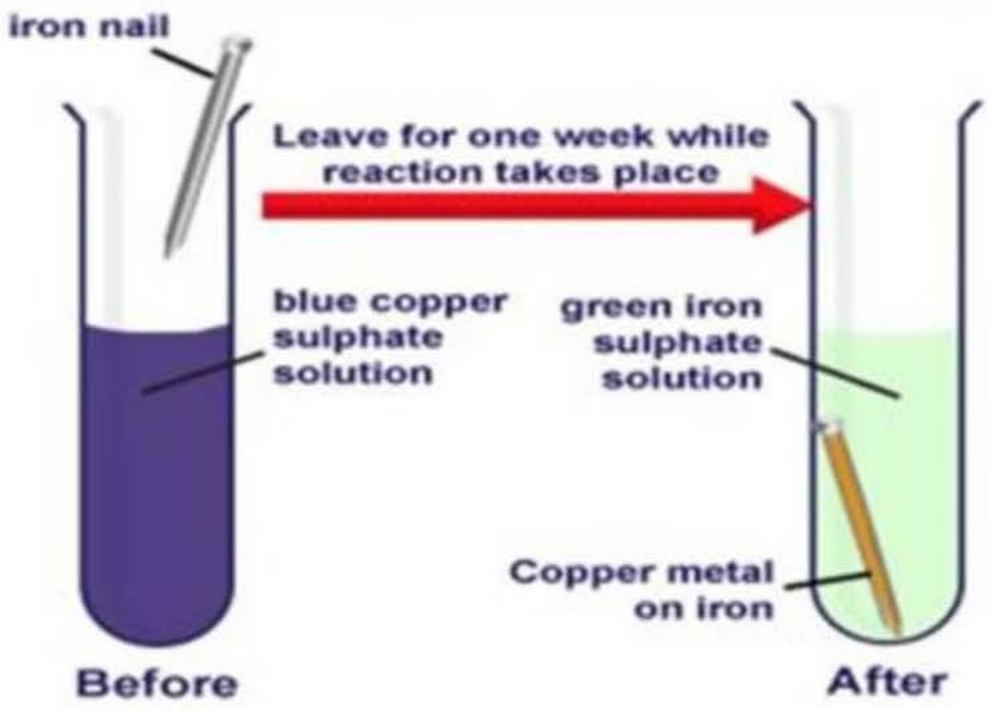
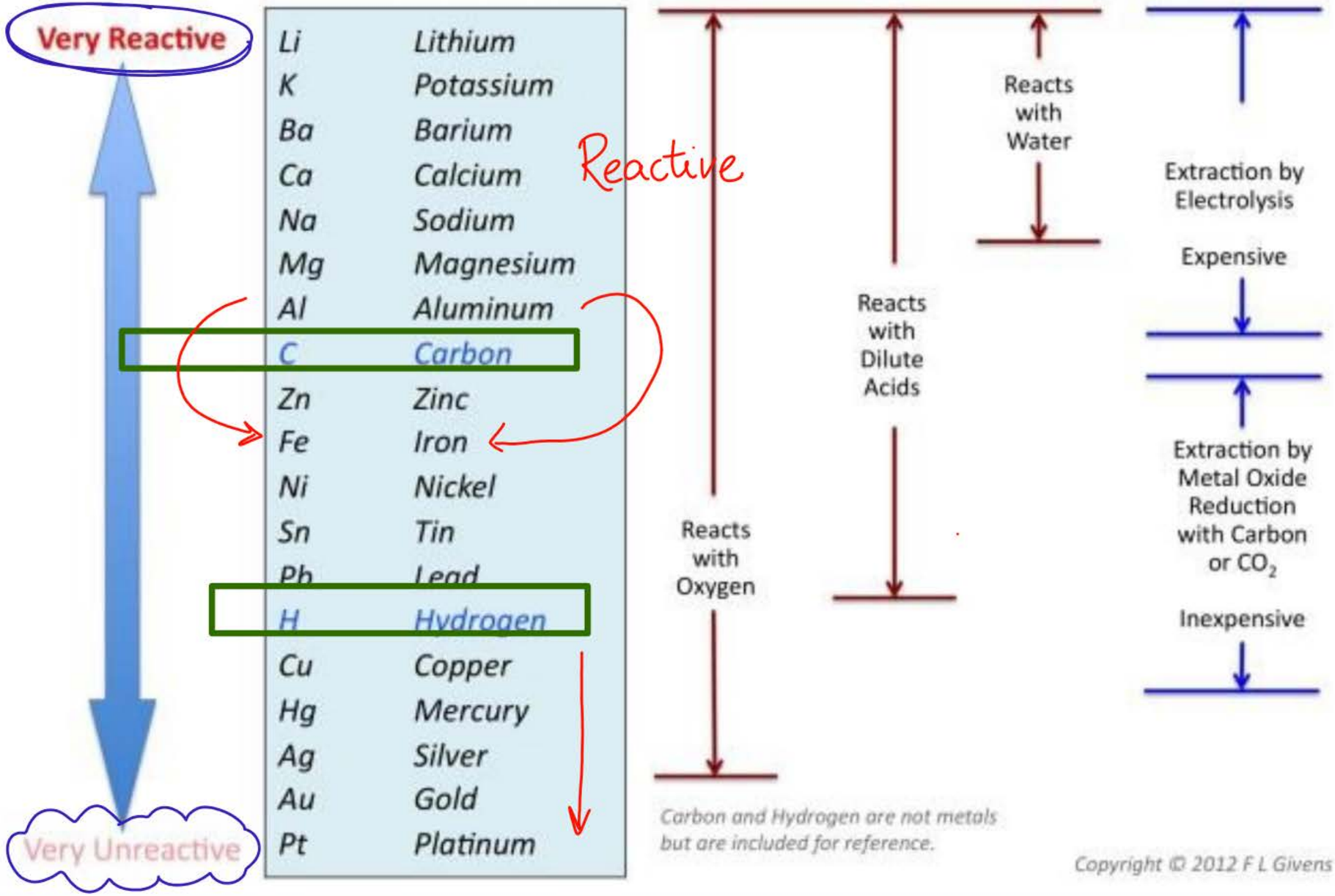


Chemical Reactions (रासायनिक अभिक्रियाएँ)



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14 एक छात्र ने जिंक और सल्फ्यूरिक अम्ल की अभिक्रिया कराई, जिससे एक गैस के साथ जिंक सल्फेट बना। बनने वाली गैस का नाम बताएं।

A Student Reacted Zinc And Sulfuric Acid, Producing A Gas Called Zinc Sulphate. Name The Gas Formed.

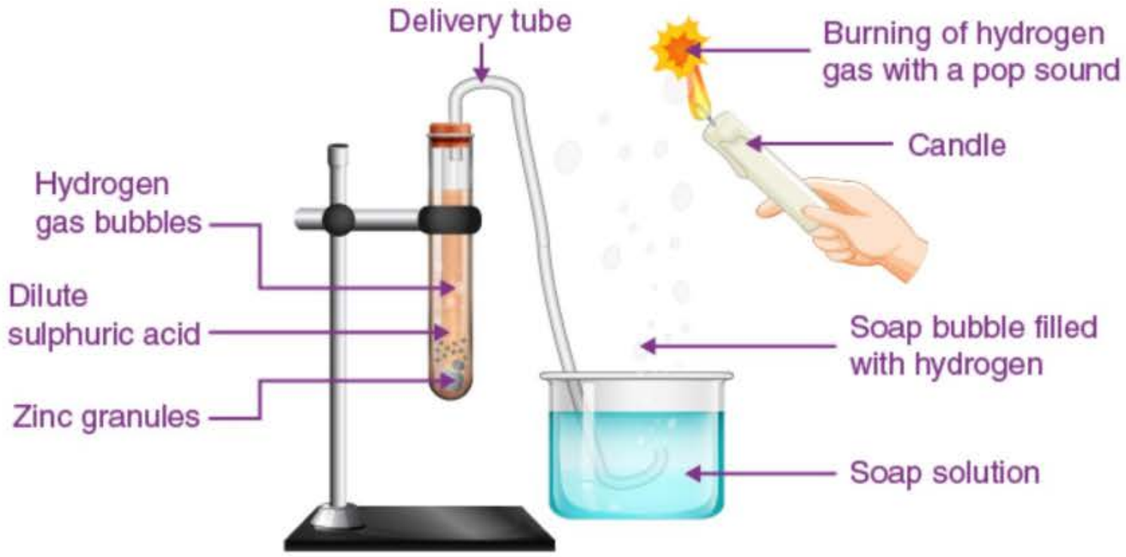
Metal + Acid ⟶ Hydrogen Gas

(A) हाईड्रोजन / Hydrogen

(B) कार्बन डाईऑक्साइड / Carbon Dioxide

(C) ऑक्सीजन / Oxygen

(D) कार्बन मोनोऑक्साइड / Carbon Monoxide



Note that the metal in the above reactions displaces hydrogen atoms from the acids as hydrogen gas and forms a compound called a salt. Thus, the reaction of a metal with an acid can be summarised as –

Acid + Metal → Salt + Hydrogen gas

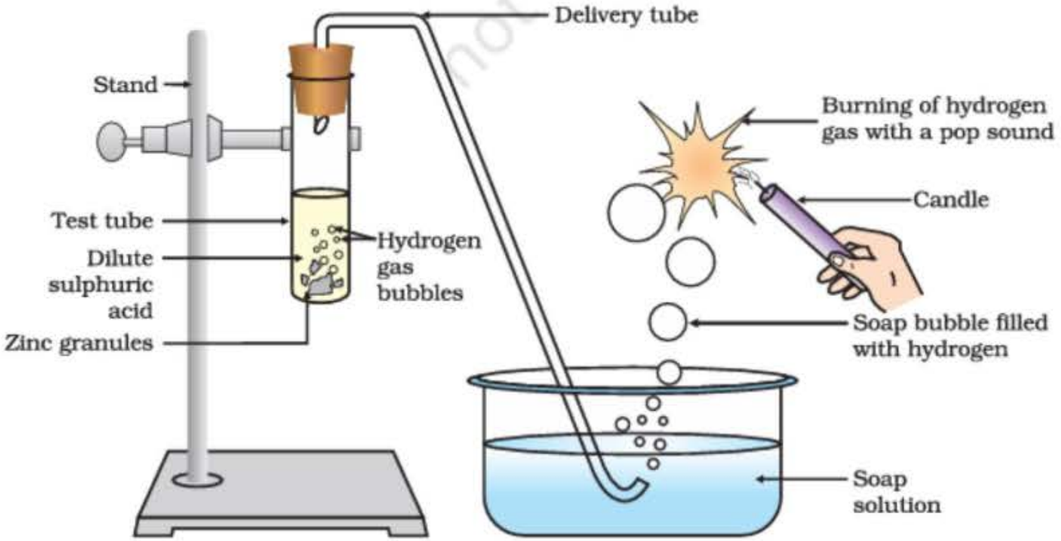


Figure 2.1 *Reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning*

अपवाद

HNO_3

जब धातुएँ नाइट्रिक अम्ल के साथ अभिक्रिया करती हैं तब हाइड्रोजन गैस उत्सर्जित नहीं होती है। क्योंकि HNO_3 एक प्रबल ऑक्सीकारक होता है जो उत्पन्न H_2 को ऑक्सीकृत करके जल में परिवर्तित कर देता है एवं स्वयं नाइट्रोजन के किसी ऑक्साइड (N_2O, NO, NO_2) में अपचयित हो जाता है। लेकिन मैग्नीशियम (Mg) एवं मैंगनीज (Mn), अति तनु HNO_3 के साथ अभिक्रिया कर H_2 गैस उत्सर्जित करते हैं।

Hydrogen gas is not evolved when a metal reacts with nitric acid. It is because HNO_3 is a strong oxidising agent. It oxidises the H_2 produced to water and itself gets reduced to any of the nitrogen oxides (N_2O, NO, NO_2). But magnesium (Mg) and manganese (Mn) react with very dilute HNO_3 to evolve H_2 gas.

Reaction of Copper, Silver and Mercury with Nitric Acid

$$Cu + 4HNO_3 \rightarrow Cu(NO_3)_2 + 2NO_2 + 2H_2O$$

Copper — Nitric Acid — Copper Nitrate — Nitrogen Dioxide — Water

$$3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$$

Copper — Nitric Acid — Copper Nitrate — Nitrogen Dioxide — Water

Cu, Ag and Hg give such type of reactions

15 निम्न में से कौन-सी अभिक्रिया विस्थापन अभिक्रिया का उदाहरण है?

Which of the following reactions is an example of displacement reaction?

(a) $2FeSO_4(s) \longrightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$ ✗ विघटन

(b) $CaO(s) + H_2O(l) \longrightarrow Ca(OH)_2(aq) + Heat$ संयोजन

(c) $3Fe(s) + 4H_2O(1) \longrightarrow Fe_3O_4(s) + 2H_2(1)$ (संयोजन)

(d) $Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$

16 जब कोई छात्र दूध में नींबू की कुछ बूंदें मिलाता है, तो कौन-सी अभिक्रिया होती है?

When a student adds a few drops of lemon to milk, which reaction occurs?

(A) विस्थापन अभिक्रिया / Displacement Reaction

(B) जल अपघटन / Hydrolysis

(C) अवक्षेपण अभिक्रिया / Precipitation Reaction

(D) संयोजन अभिक्रिया / Combination Reaction

1.2.4 Double Displacement Reaction

ionic Bond
– धातु + अधातु

Coralend Bond ✗

Activity 1.10

- Take about 3 mL of sodium sulphate solution in a test tube.
- In another test tube, take about 3 mL of barium chloride solution.
- Mix the two solutions (Fig. 1.9).
- What do you observe?

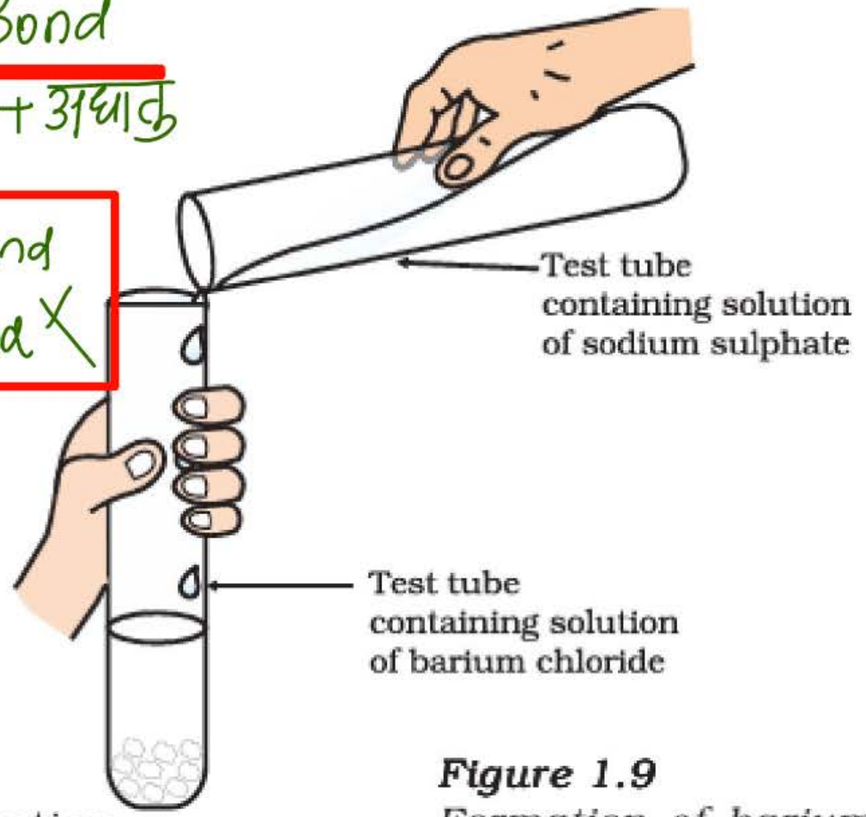


Figure 1.9 *Formation of barium sulphate and sodium chloride*

You will observe that a white substance, which is insoluble in water, is formed. This insoluble substance formed is known as a precipitate. Any reaction that produces a precipitate can be called a precipitation reaction.

$$\underset{\text{(Sodium sulphate)}}{Na_2SO_4(aq)} + \underset{\text{(Barium chloride)}}{BaCl_2(aq)} \rightarrow \underset{\text{(Barium sulphate)}}{BaSO_4(s)} + \underset{\text{(Sodium chloride)}}{2NaCl(aq)} \qquad (1.27)$$


PC MAX — 2/3

17

निम्न में से कौन-सी रासायनिक अभिक्रिया की प्रकृति हमेशा ऊष्माशोषी होती है?

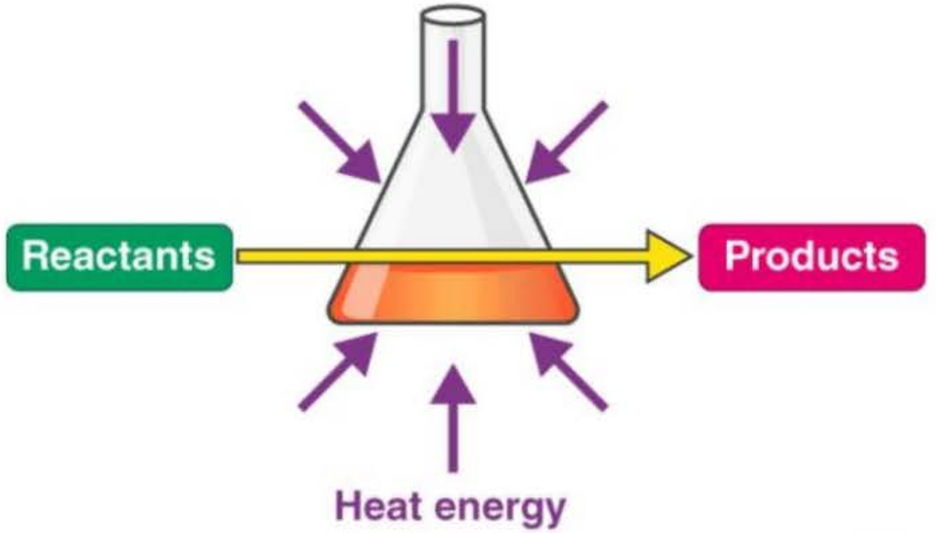
Which of the following chemical reactions is always Endothermic In Nature?

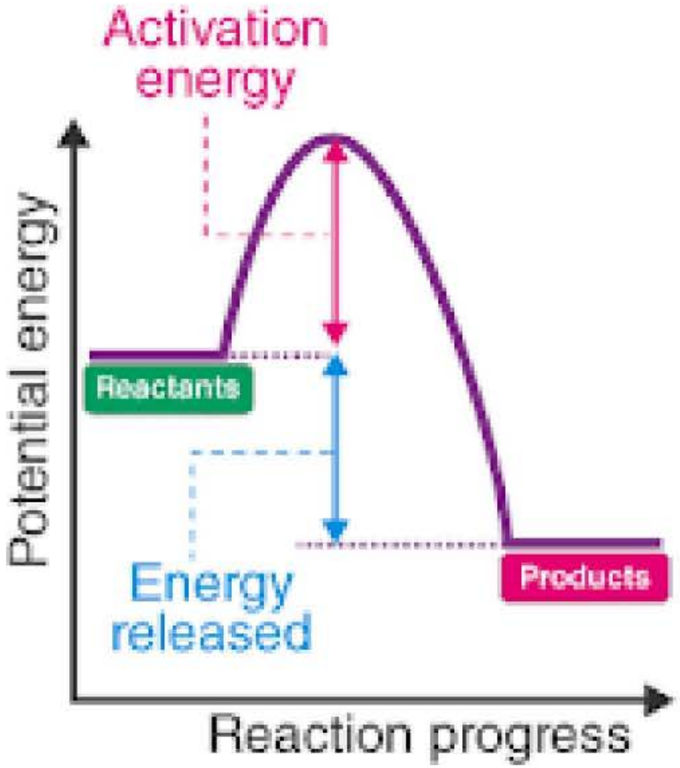
(A) दहन प्रतिक्रिया / Combustion Reaction

(B) अपघटन प्रतिक्रिया / Decomposition Reaction

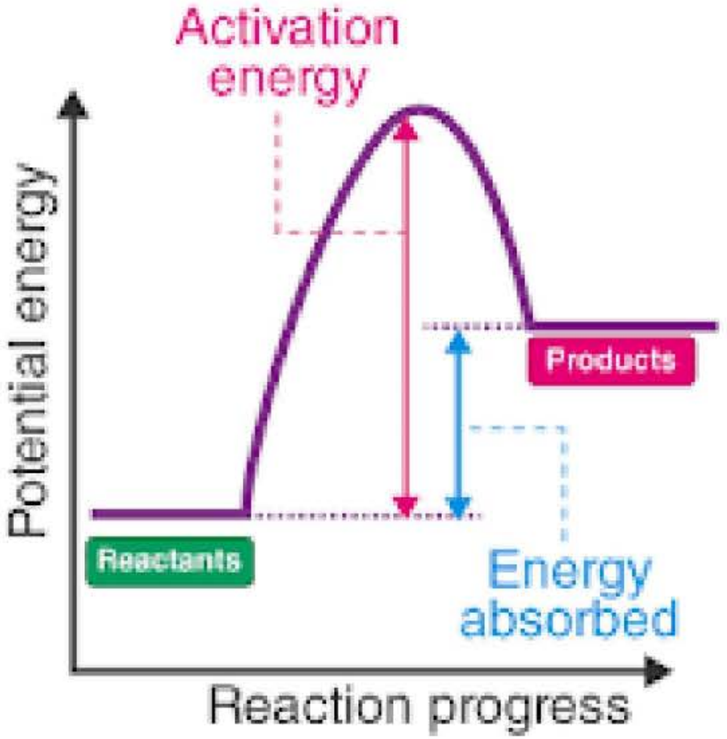
(C) विस्थापन प्रतिक्रिया / Displacement Reaction

(D) संयोजन प्रतिक्रिया / Combination Reaction





Exothermic Reaction



Endothermic Reaction

18 दी गई अभिक्रिया_____ का उदाहरण है। The given reaction is an example of_____.

$$2NaOH(aq) + H_2SO_4(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(I)$$

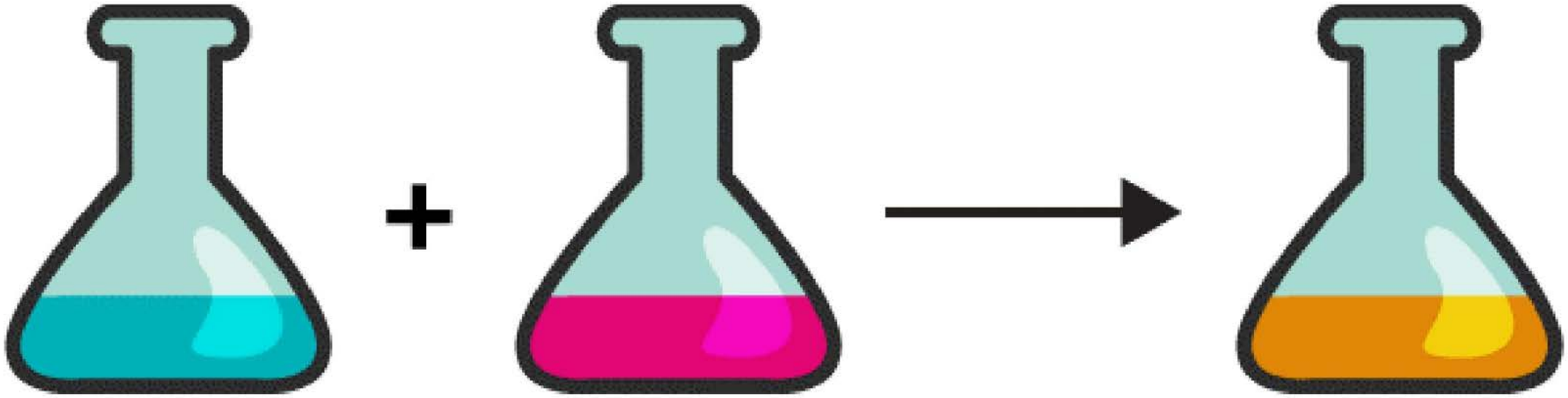
Base + Acid ⟶ लवण (Salt) + water (Neutri)

(A) अपघटन अभिक्रिया / Decomposition Reaction

(B) अवक्षेपण अभिक्रिया / Precipitation Reaction

(C) रेडॉक्स अभिक्रिया / Redox Reaction

(D) उदासीनीकरण अभिक्रिया / Neutralization Reaction



ACID + BASE ⟶ H^+OH^- + SALT

19

अवक्षेपण अभिक्रियाएं, एक विशिष्ट श्रेणी की _____ हैं।

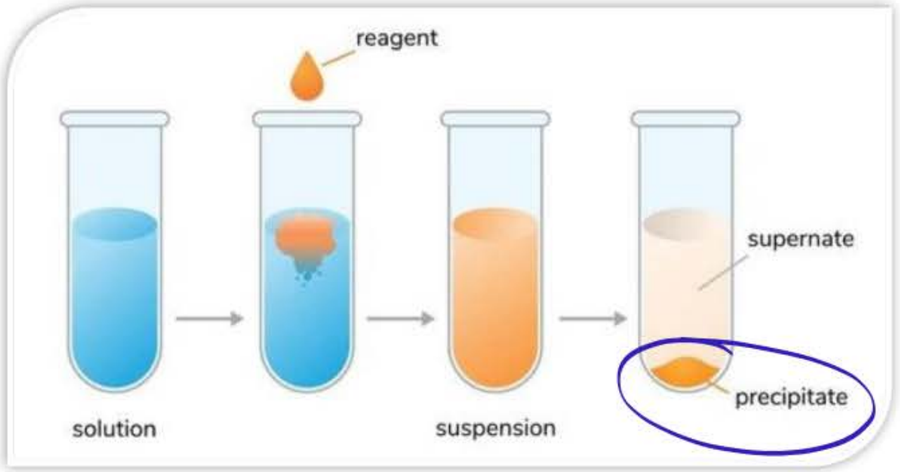
Precipitation reactions are a special category of _____.

(a) रेडॉक्स अभिक्रियाएं / Redox Reactions

(B) संयोजन अभिक्रियाएं / Combination Reactions

(C) द्वि-विस्थापन अभिक्रियाएं / Double Displacement Reactions

(D) अपघटन अभिक्रियाएं / Decomposition Reactions



Solid

1.2.4 Double Displacement Reaction

Activity 1.10

- Take about 3 mL of sodium sulphate solution in a test tube.
- In another test tube, take about 3 mL of barium chloride solution.
- Mix the two solutions (Fig. 1.9).
- What do you observe?

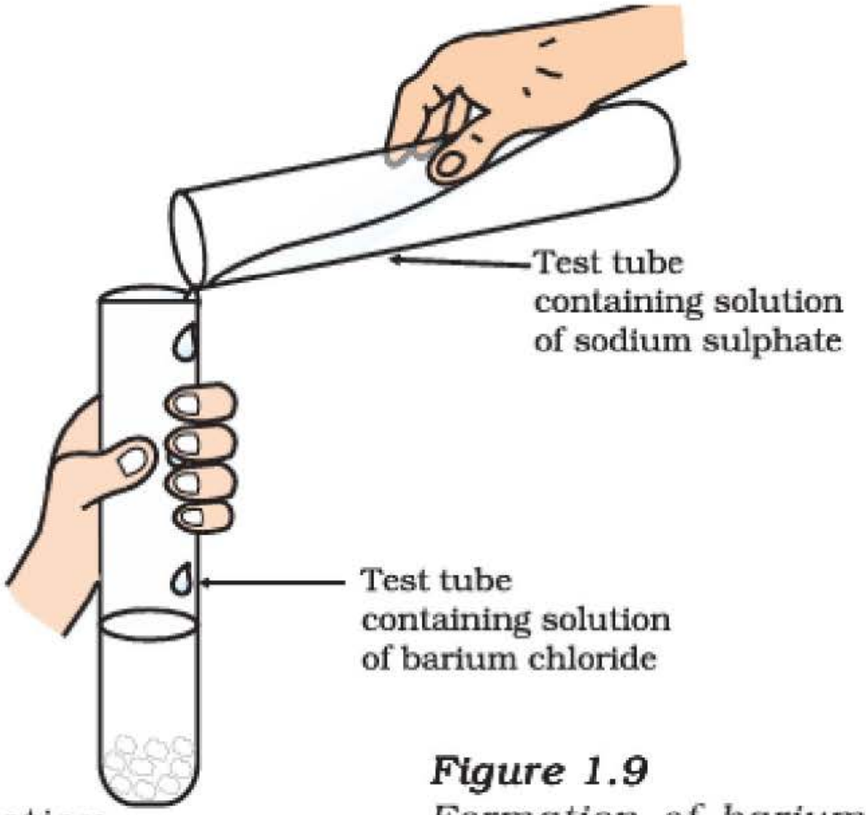


Figure 1.9 *Formation of barium sulphate and sodium chloride*

You will observe that a white substance, which is insoluble in water, is formed. This insoluble substance formed is known as a precipitate. Any reaction that produces a precipitate can be called a precipitation reaction.

$$\underset{\text{(Sodium sulphate)}}{Na_2SO_4(aq)} + \underset{\text{(Barium chloride)}}{BaCl_2(aq)} \rightarrow \underset{\text{(Barium sulphate)}}{BaSO_4(s)} + \underset{\text{(Sodium chloride)}}{2NaCl(aq)} \qquad (1.27)$$

Precipitation

20

लेड नाइट्रेट और पोटैशियम आयोडाइड के बीच अभिक्रिया _____ का एक उदाहरण है।

The reaction between lead nitrate and potassium iodide is an example of _____.

(A) अपघटन अभिक्रिया / Decomposition Reaction

(B) विस्थापन अभिक्रिया / Displacement Reaction

(C) संयोजन अभिक्रिया / Combination Reaction

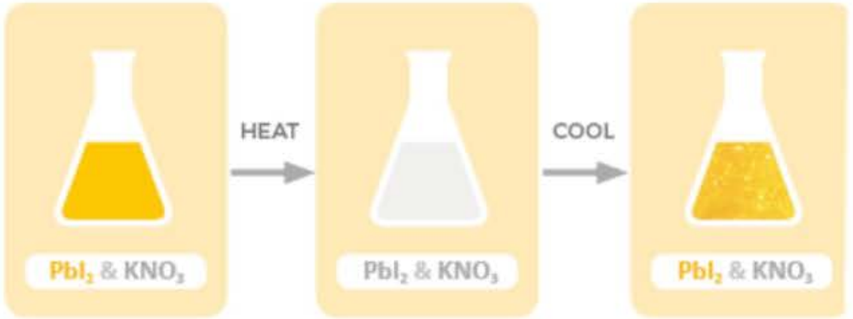
(D) द्विविस्थापन अभिक्रिया / Double Displacement Reaction

THE LEAD IODIDE 'GOLDEN RAIN' REACTION

The reaction between potassium iodide and lead nitrate is often used to demonstrate differences in solubilities, as well as the recrystallisation process.

THE EXPERIMENT

The lead iodide is more soluble in warm water than in cold. It dissolves when heated, reappearing as 'golden rain' on cooling.



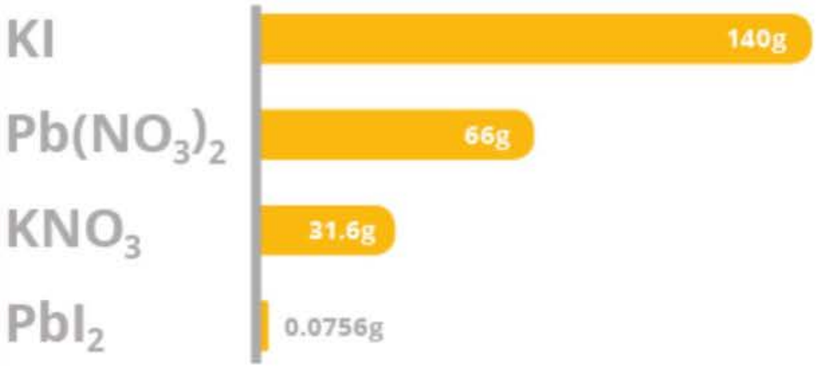
Lead salts are toxic and can cause lead poisoning so

THE EXPLANATION

$$2KI + Pb(NO_3)_2 \rightarrow PbI_2 + 2KNO_3$$

When the two solutions of potassium iodide (KI) and lead nitrate ($Pb(NO_3)_2$) react, they produce soluble potassium nitrate (KNO_3) and insoluble lead iodide (PbI_2). This is visible as a yellow precipitate in the solution.

The lead iodide produced dissolves in the solution if it is heated, causing the yellow precipitate to disappear and leaving a colourless solution. If this solution is allowed to cool slowly, crystals of lead iodide begin to form, causing the glistening 'golden rain' effect.



SOLUBILITY IN 100ml OF WATER (AT 20°C)

21 निम्नलिखित में से कौन एक द्वि-विस्थापन अभिक्रिया नहीं है?

Ionic Bond

Which of the following is not a double displacement reaction?

(a) $CuSO_4 + H_2S \longrightarrow CuS + H_2SO_4$

(b) $Mg_3N_2 + 6H_2O \longrightarrow 3Mg(OH)_2 + 2NH_3$ → Covalent

(c) $BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + 2HCl$

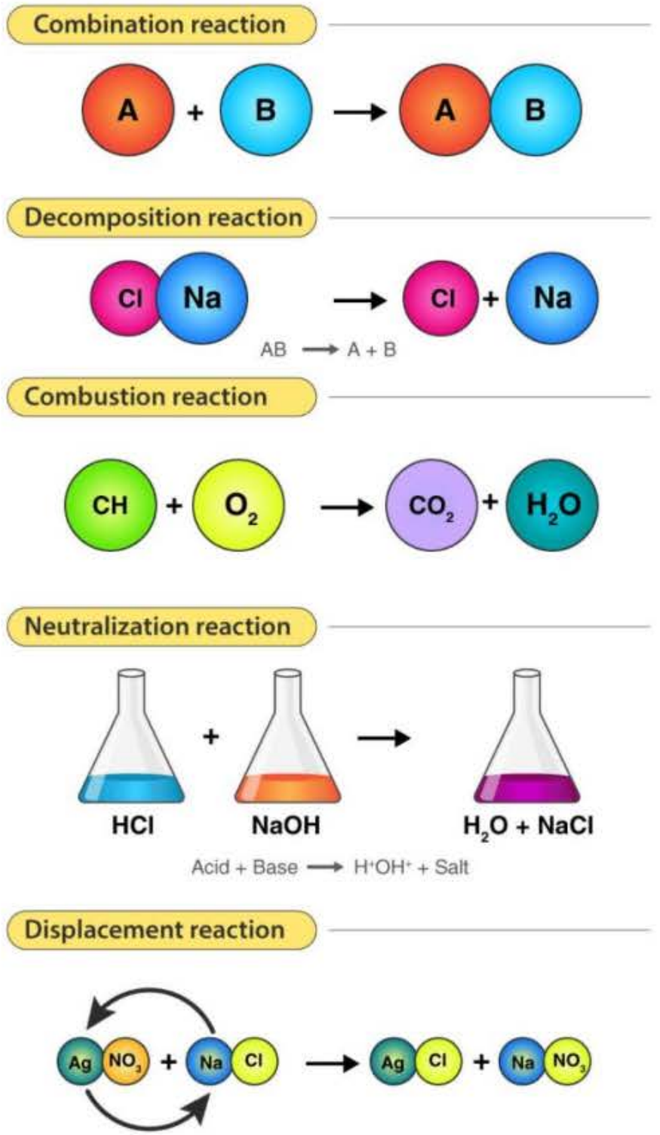
(d) $NaOH + HCl \longrightarrow NaCl + H_2O$

Chemical Reactions (रासायनिक अभिक्रियाएँ)

रासायनिक अभिक्रियाएँ निम्न प्रकार की होती है

Chemical Reactions Are Of The Following Types

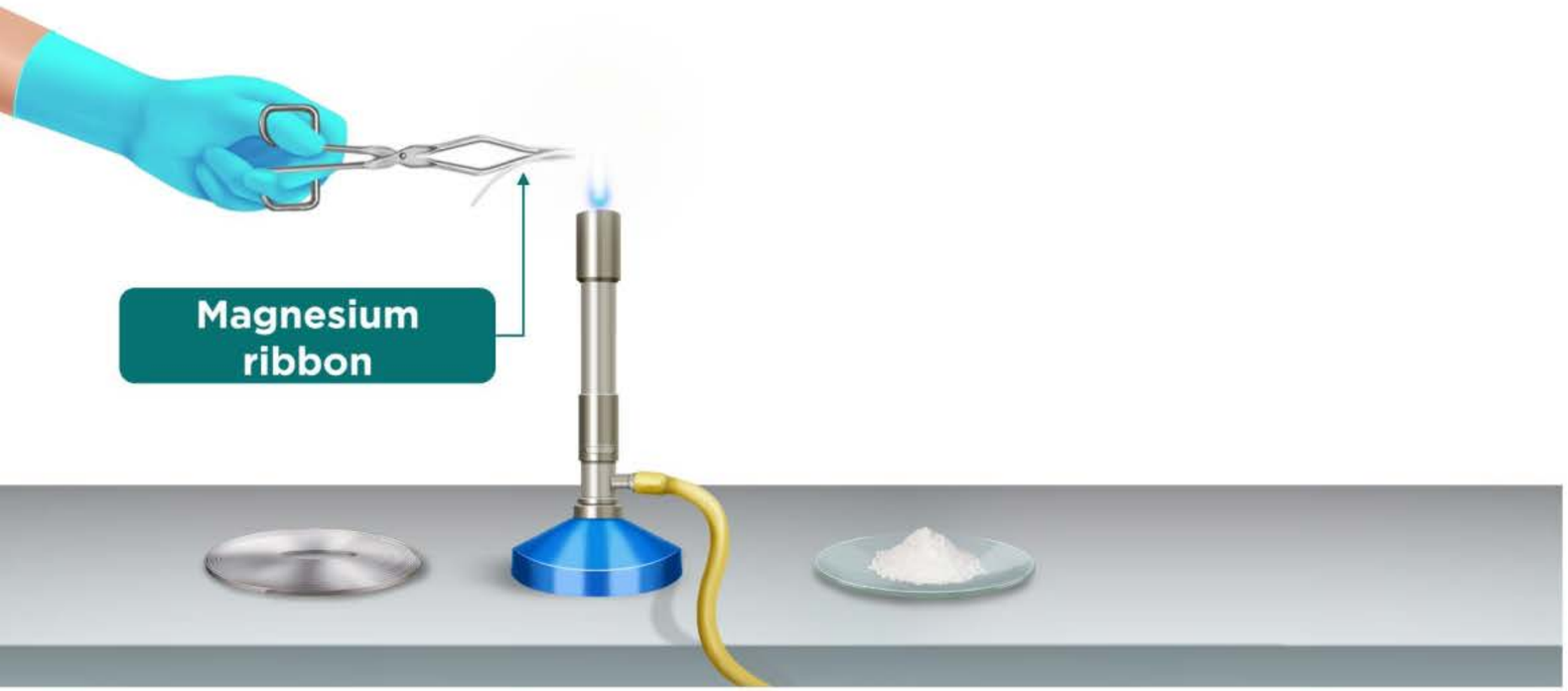
1. संयोजन अभिक्रिया / Combination Reaction
2. वियोजन या अपघटन अभिक्रिया / Decomposition Reaction
3. विस्थापन अभिक्रिया / Displacement Reaction
4. द्वि-विस्थापन /Double -Displacement
5. उपचयन एवं अपचयन / Oxidation And Reduction



22

एक मैग्नीशियम रिबन वायु (ऑक्सीजन) में एक चमकदार लौ के साथ जलता है, और एक सफेद पदार्थ 'X' में परिवर्तित हो जाता है। X क्या है?

A magnesium ribbon burns with a bright flame in air (oxygen), and a white substance is converted into 'X'. What is X?



(a) $Mg(OH)_2$

(b) MgO

(c) Mg

(d) $MgCO_3$

23

उदासीनीकरण अभिक्रिया में निम्न में से कौन से उत्पाद बनते हैं?

Which of the following products are formed in neutralization reaction?

(a) अवक्षेप और क्षारक / Precipitate and base

(b) अम्ल और जल / acid and water

(c) लवण और अम्ल / salts and acids

(d) लवण और जल / salt and water

24 क्लोरीन गैस पोटैशियम आयोडाइड विलयन से अभिक्रिया करके पोटैशियम क्लोराइड और आयोडीन का निर्माण करती है। यह किस प्रकार की अभिक्रिया का उदाहरण है?

Chlorine gas reacts with potassium iodide solution to form potassium chloride and iodine. What type of reaction is this an example of?

$Cl_2(g) + 2KI \rightarrow KCl + I_2$

(a) द्वि-विस्थापन अभिक्रिया / double displacement reaction

(b) विस्थापन अभिक्रिया / displacement reaction

(c) अपघटन अभिक्रिया / decomposition reaction

(d) संयोजन अभिक्रिया / combination reaction

25 एथेनॉल का ऐसीटिक अम्ल में रूपांतरण किसका उदाहरण है?

Conversion of ethanol into acetic acid is an example of?

$C_2H_5OH \xrightarrow{\text{Oxidation}} CH_3COOH$

$O_2 \uparrow$

$H_2 \downarrow$

(a) अपचयन अभिक्रिया / Reduction Reaction

(B) ऑक्सीकरण अभिक्रिया / Oxidation Reaction

(C) योग्य अभिक्रिया / Appropriate Reaction

(D) प्रतिस्थापन अभिक्रिया / Replacement Reaction

REDOX REACTION

Reduction
अपचयन

e⁻ का निकलना

(I) $Na - e^- \rightarrow Na^+$

$Fe - 2e \rightarrow Fe^{+2}$

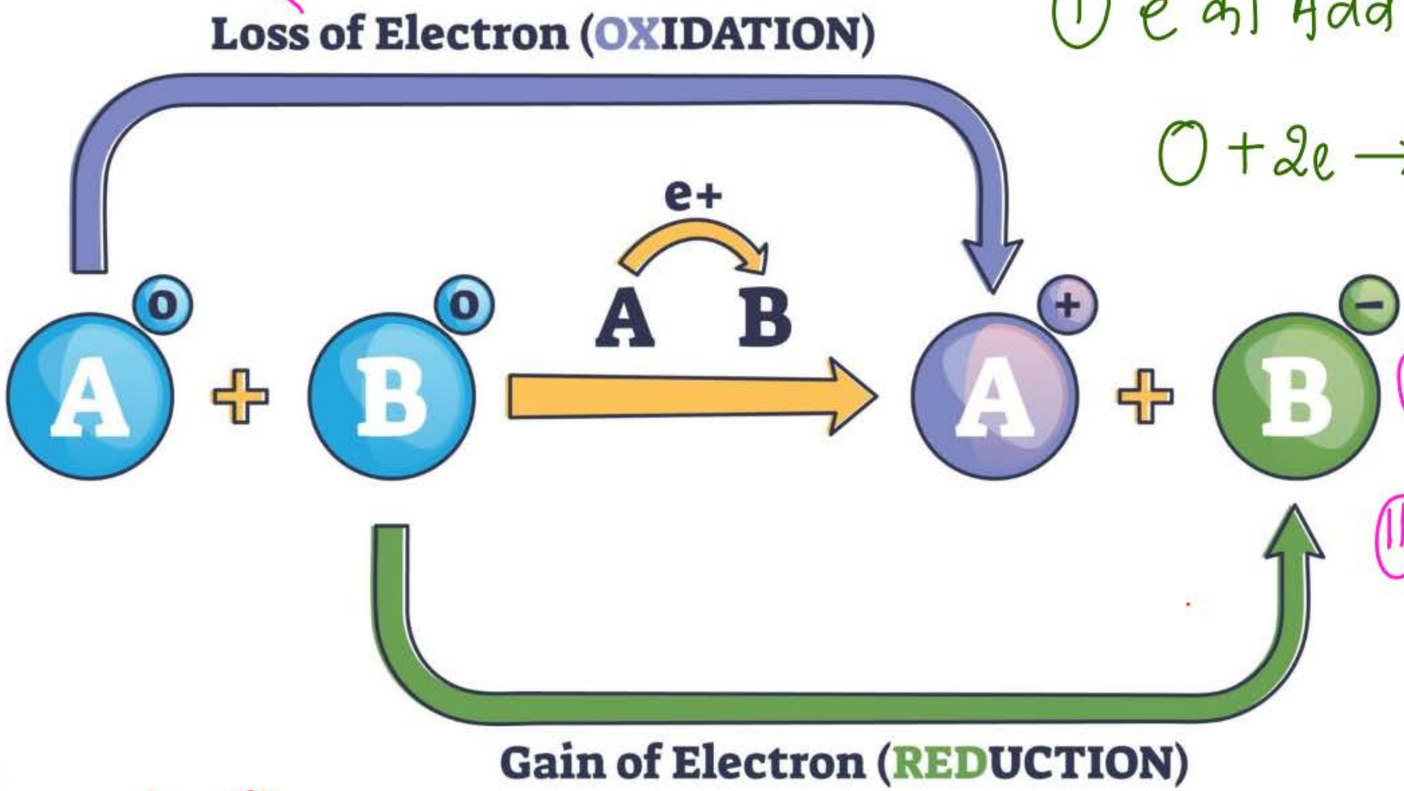
(II) O_2 का Add

$C + O_2 \rightarrow CO_2$

$H_2 + O_2 \rightarrow H_2O$

(III) Hydrogen का निकलना

$CH_4 - H \rightarrow CH_3$ (C का ऑक्सी)



(I) e का Add

$O + 2e \rightarrow O^{-2}$

(II) O_2 निकलना

(III) H_2 मिलना

Chemical Reactions (रासायनिक अभिक्रियाएँ)

प्रभावित कारक (Influenced Factor)	Oxidation (ऑक्सीकरण)	Reduction (अपचयन)
विद्युत धनात्मक परमाणुओं का अनुपात (Ratio of Electropositive Atoms)	कम होता है (Decreases)	बढ़ता है (Increases)
विद्युत ऋणात्मक परमाणुओं का अनुपात (Ratio of Electronegative Atoms)	बढ़ता है (Increases)	कम होता है (Decreases)
ऑक्सीजन (Oxygen) →	लाभ होता है (Gain)	हानि होती है (Loss)
हाइड्रोजन (Hydrogen) →	हानि होती है (Loss)	लाभ होता है (Gain)
संयोजकता (Valency) →	बढ़ती है (Increases)	घटती है (Decreases)
इलेक्ट्रॉन (Electron) →	कम होते हैं (Loss)	बढ़ते हैं (Gain)
धात्विक तत्व (Metallic Element) →	कमी होती है (Decrease)	बढ़ती है (Increase)
अधात्विक तत्व (Non-Metallic Element)	वृद्धि होती है (Increase)	कमी होती है (Decrease)

दी गई रासयनिक अभिक्रिया में फरेस सल्फेट का रंग कैसा होता है?

What is the color of ferrous sulphate in the given chemical reaction?

$$2FeSO_4(s) \rightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$$

(A) हरा / Green

(B) नीला / Blue

(C) लाल / Red

(D) पीला / Yellow

$$2FeSO_4(s) \xrightarrow{\text{Heat}} Fe_2O_3(s) + SO_2(g) + SO_3(g) \quad (1.19)$$

(Ferrous sulphate) (Ferric oxide)

In this reaction you can observe that a single reactant breaks down to give simpler products. This is a decomposition reaction. Ferrous sulphate crystals ($FeSO_4$, $7H_2O$) lose water when heated and the colour of the crystals changes. It then decomposes to ferric oxide (Fe_2O_3), sulphur dioxide (SO_2) and sulphur trioxide (SO_3). Ferric oxide is a solid, while SO_2 and SO_3 are gases.

26

निम्न में से किस अभिक्रिया को द्विविस्थापन अभिक्रिया माना जाएगा?

Which of the following reactions will be considered as double displacement reaction?

Comb

(a) $MgO + H_2O \longrightarrow Mg(OH)_2$

(b) $Zn + FeCl_3 \longrightarrow ZnCl_2 + Fe$ – displacement

(c) $HCl + KOH \longrightarrow KCl + H_2O$

(d) $H_2CO_3 \longrightarrow CO_2 + H_2O$ – विघटन

27

मेथेन और क्लोरीन गैस से मेथिल क्लोराइड का बनना किस प्रकार की अभिक्रिया है?

What Type Of Reaction Is The Formation Of Methyl Chloride From Methane And Chlorine Gas?

$$CH_4 + Cl_2 \longrightarrow CH_3Cl + HCl$$

(A) दहन अभिक्रिया / Combustion Reaction

(B) प्रतिस्थापन अभिक्रिया / Replacement Reaction

(C) योगज अभिक्रिया / Addition Reaction

(D) ऑक्सीकरण अभिक्रिया / Oxidation Reaction

$$CH_3-H + Cl-Cl \longrightarrow$$

= DDR

28 एल्युमिनियम पर ऑक्साइड की एक मोटी परत बनाने की प्रक्रिया है।

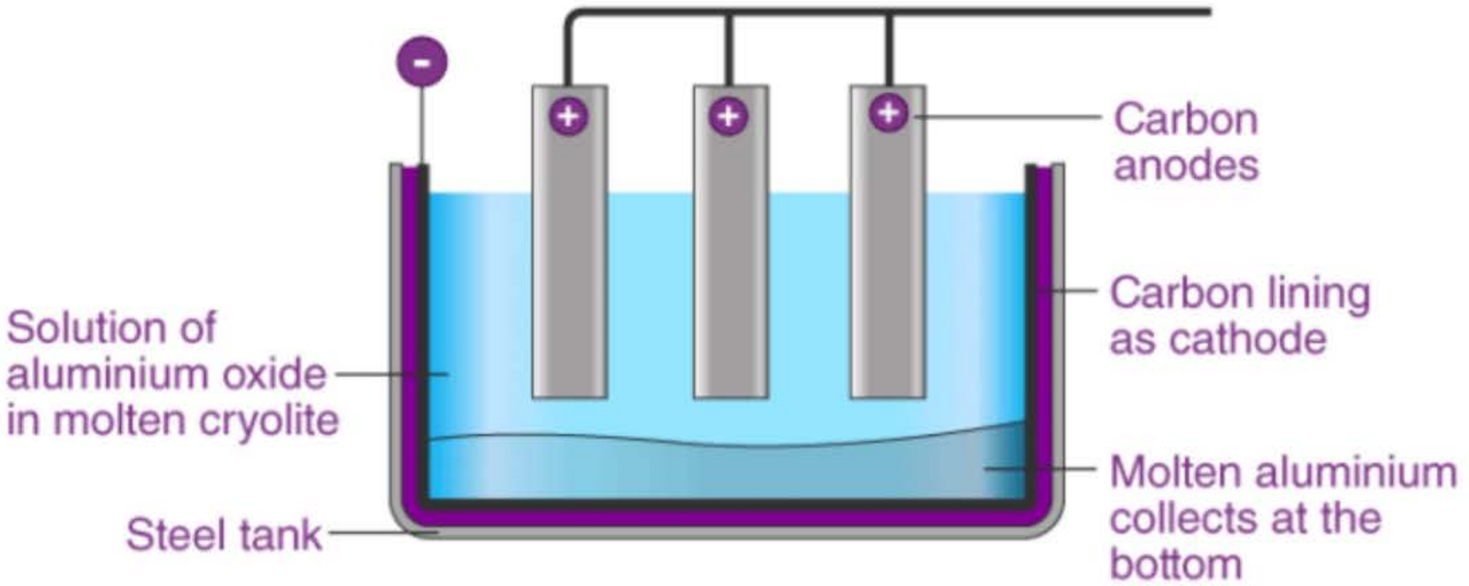
The Process Of Forming A Thick Layer Of Oxide On Aluminium.

(A) ऐनोडीकरण / Anodization

(B) चादर लगाना / Sheeting

(C) परिरक्षण / Shielding

(D) आंस्तरण / Transfer



Similarly, aluminium is obtained by the electrolytic reduction of aluminium oxide.

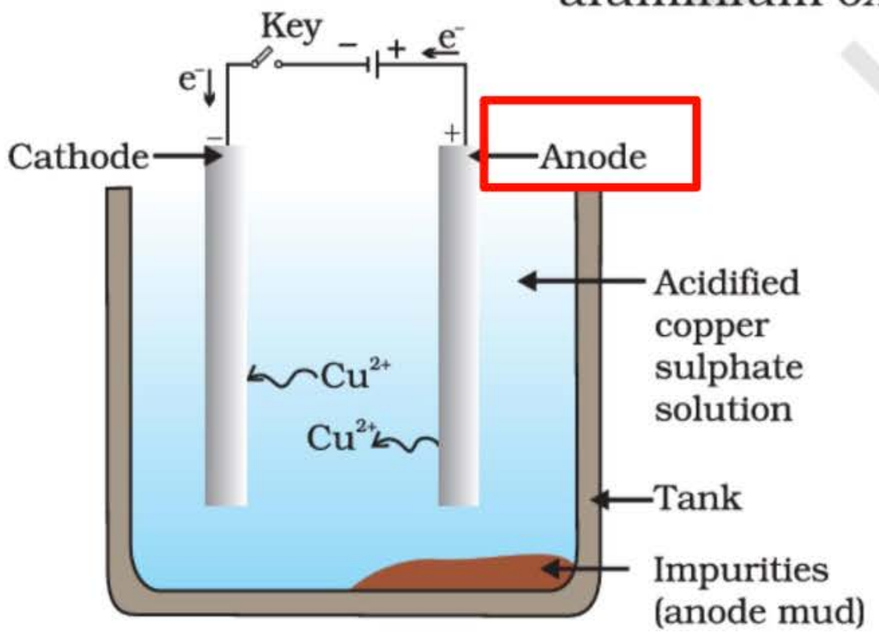


Figure 3.12
Electrolytic refining of copper. The electrolyte is a solution of acidified copper sulphate. The anode is impure copper, whereas, the cathode is a strip of pure copper. On passing electric current, pure copper is deposited on the cathode.

3.4.6 Refining of Metals

The metals produced by various reduction processes described above are not very pure. They contain impurities, which must be removed to obtain pure metals. The most widely used method for refining impure metals is electrolytic refining.

Electrolytic Refining: Many metals, such as copper, zinc, tin, nickel, silver, gold, etc., are refined electrolytically. In this process, the impure metal is made the anode and a thin strip of pure metal is made the cathode. A solution of the metal salt is used as an electrolyte. The apparatus is set up as shown in Fig. 3.12. On passing the current through the electrolyte, the pure metal from the anode dissolves into the electrolyte. An equivalent amount of pure

1.2.4 Double Displacement Reaction

Activity 1.10

- Take about 3 mL of sodium sulphate solution in a test tube.
- In another test tube, take about 3 mL of barium chloride solution.
- Mix the two solutions (Fig. 1.9).
- What do you observe?

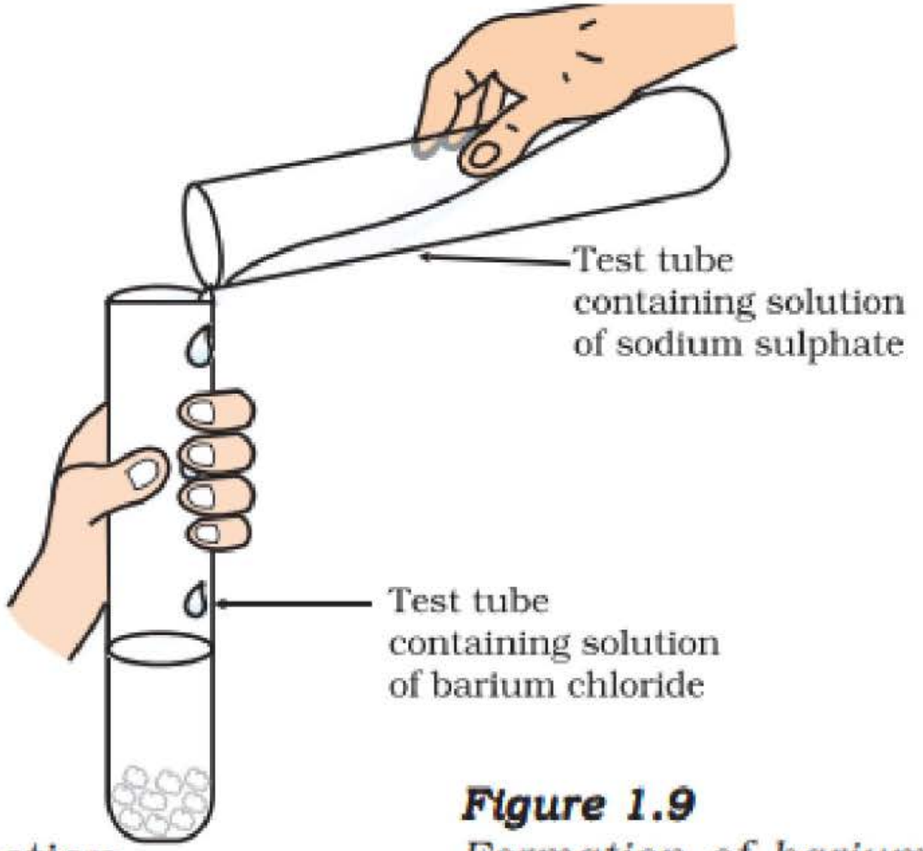


Figure 1.9
Formation of barium sulphate and sodium chloride

You will observe that a white substance, which is insoluble in water, is formed. This insoluble substance formed is known as a precipitate. Any reaction that produces a precipitate can be called a precipitation reaction.

$$\underset{\text{(Sodium sulphate)}}{Na_2SO_4(aq)} + \underset{\text{(Barium chloride)}}{BaCl_2(aq)} \rightarrow \underset{\text{(Barium sulphate)}}{BaSO_4(s)} + \underset{\text{(Sodium chloride)}}{2NaCl(aq)} \qquad (1.27)$$

29 सीमेंट तथा जल के मध्य रासायनिक क्रिया को कहते हैं?

What Is The Chemical Reaction Between Cement And Water Called?

Combination

(A) जलीकरण / Hydration

(B) क्लोरोनीकरण / Chlorination

(C) निस्तापन / Calcination

(D) इनमें से कोई नहीं / None Of These

30 क्लोरीन की किस पदार्थ के साथ अभिक्रिया के फलस्वरूप विरंजक चूर्ण बनता है?

Bleaching powder is formed as a result of the reaction of chlorine with which substance?

$$Ca(OH)_2 + Cl_2 \rightarrow \underbrace{CaOCl_2}_{\text{Bleaching}} + H_2O$$

(a) कॉस्टिक सोडा / Caustic Soda

(B) बुझा चूना / Slaked Lime

(C) सोडियम क्लोराइड / Sodium Chloride

(D) बिना बुझा चूना / Quicklime

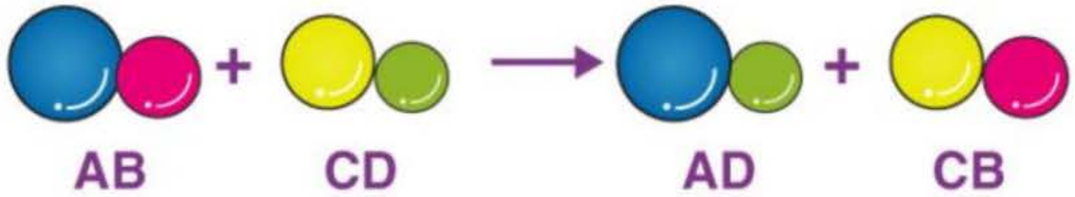
Chemical Reactions (रासायनिक अभिक्रियाएँ)

31

दी गई द्वि-विस्थापन अभिक्रिया में A और B के स्थान पर क्रमशः क्या आएगा?

What will come in place of A and B respectively in the given double displacement reaction?

$A+B \longrightarrow AgBr + KNO_3$



(a) $AgNO_3$ and KBr

(b) Ag and HMO_3

(c) HBr and NaOH

(d) HBr and NaOH

32

इनमें से कौन सी अभिक्रिया उदासीनीकरण अभिक्रिया का उदाहरण नहीं है?

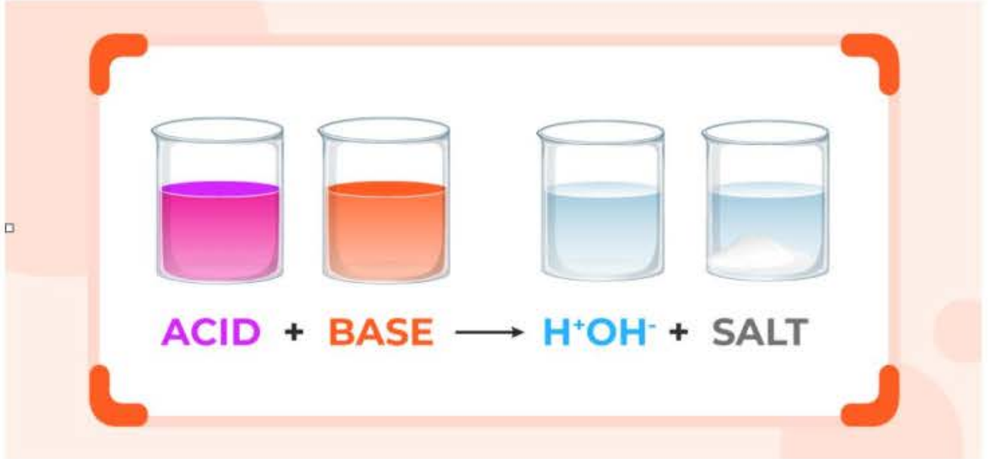
Which of the following reactions is not an example of neutralization reaction?

(a) $CaO + H_2O \longrightarrow Ca(OH)_2$

(b) $Ca(OH)_2 + H_2CO_3 \longrightarrow CaCO_3 + 2H_2O$

(c) $HNO_3 + KOH \longrightarrow KNO_3 + 2H_2O$

(d) $HNO_3 + KOH \longrightarrow KNO_3 + H_2O$



33 निम्नलिखित द्वि-विस्थापन अभिक्रिया को पूर्ण कीजिए।

Complete the following double displacement reaction.

$2NaOH + CuSO_4 \longrightarrow X + Na_2SO_4,$

(a) $CaCl_2$

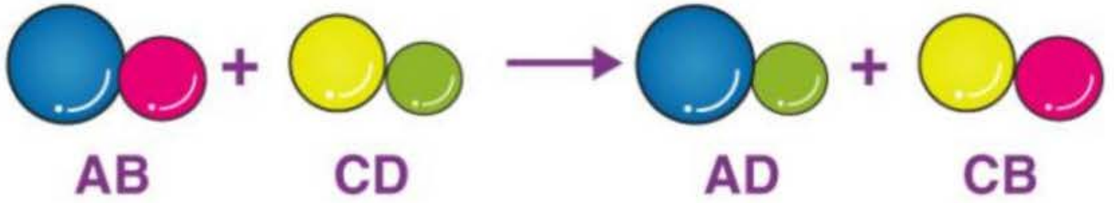
(b) $Cu(OH)_2$

(c) $Ca(OH)_2$

(d) $CuCl_2$

34 द्विविस्थापन अभिक्रिया किनके बीच होती है?

Between what does double displacement reaction take place?



(a) सहसंयोजक यौगिक / covalent compound

(b) आयनिक यौगिकों / ionic compounds

(c) न तो आयनिक और न ही सहसयोंजक यौगिकों / Neither ionic nor covalent compounds

(d) आयनिक और सहसंयोजक दोनों यौगिकों / Both ionic and covalent compounds

35

Study the given chemical reaction and find the values of x, y and z, respectively.

Equation (maths)

$$xFe(s) + yH_2O(g) \rightarrow Fe_3O_4 + zH_2(g)$$

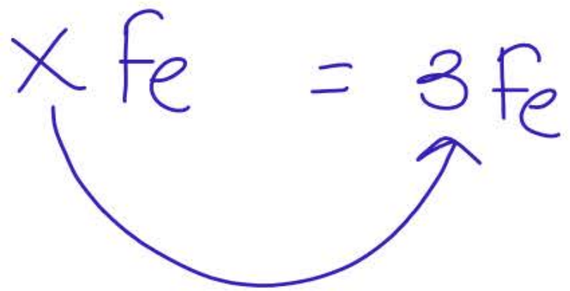
Reactant = product

A. 2, 4, 3

B. 4, 3, 4

C. 4, 4, 3

D. 3, 4, 4



36

दी गई संतुलित रासायनिक अभिक्रिया में, x, y, और z के मान क्रमश: क्या होंगे?

In the given balanced chemical reaction, what will be the values of x, y, and z respectively?

$$xS_8 + yC \longrightarrow zCS_2$$

X Y Z

(a) 1, 4, 4

(b) 2, 3, 6

(c) 1, 3, 5

(d) 2, 6, 3

$yC = zC$

$y = z$