

# CHEMISTRY OF CHANGES

One of the properties of matter is that it occupies space. The space occupied by matter is its volume.

Mass of a substance is the measure of the quantity of matter contained in it.

Anything that occupies space and has mass is called matter.

Slow changes	Fast changes
<ul style="list-style-type: none"><li>• rusting of iron</li><li>• ripening of fruits</li><li>• formation of coal</li><li>• formation of coal</li><li>• growth of trees</li></ul>	<ul style="list-style-type: none"><li>• lighting of a gas stove</li><li>• bursting of crackers</li><li>• reaction between baking soda and vinegar</li><li>• burning of paper</li></ul>

No new substances are formed during a physical change. Only the molecular arrangement changes. But in chemical change, a substance is converted into another one. That means, new molecules are formed.

Classify the following changes into physical change and chemical change.

- |                          |                                  |
|--------------------------|----------------------------------|
| i) curdling of milk      | ii) melting of wax               |
| iii) burning of a candle | iv) formation of ice             |
| v) melting of ice        | vi) dissolution of salt in water |
| vii) rusting of iron     | viii) burning of firewood        |

Physical change=melting of ice, melting of wax, formation of ice, dissolution of salt in water.

Chemical change=curdling of milk, burning of a candle, rusting of iron, burning of firewood.

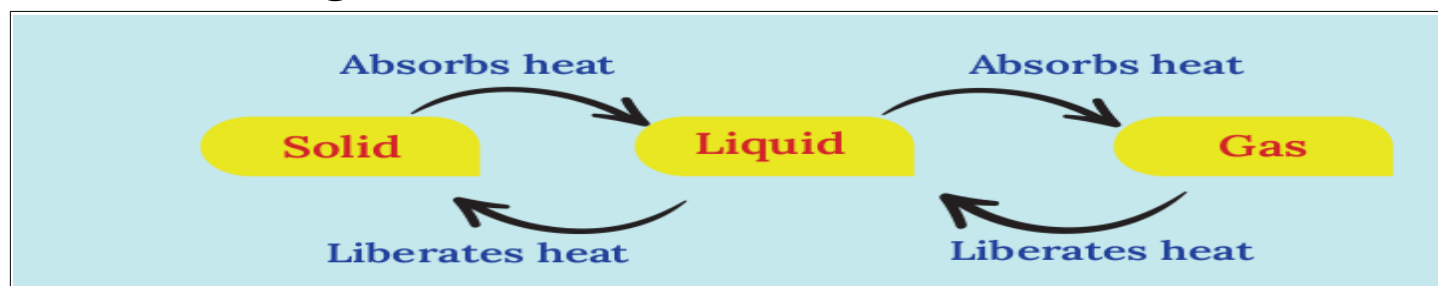
What happens to the distance between particles and energy of particles when solids are heated?

Distance between the particles :decreases

Energy of the particles:increases.

Solid substances like Camphor and Naphthalene when heated, directly change to gases. This is known as Sublimation.

The change of substance from one physical state into another is known as change of state.



the substances which take part in a chemical reaction are known as reactants and the substances formed are known as products.

If heat is liberated as a result of a chemical reaction, such reactions are known as exothermic reactions.

If heat energy is absorbed during a chemical reaction, it is known as an endothermic reaction.

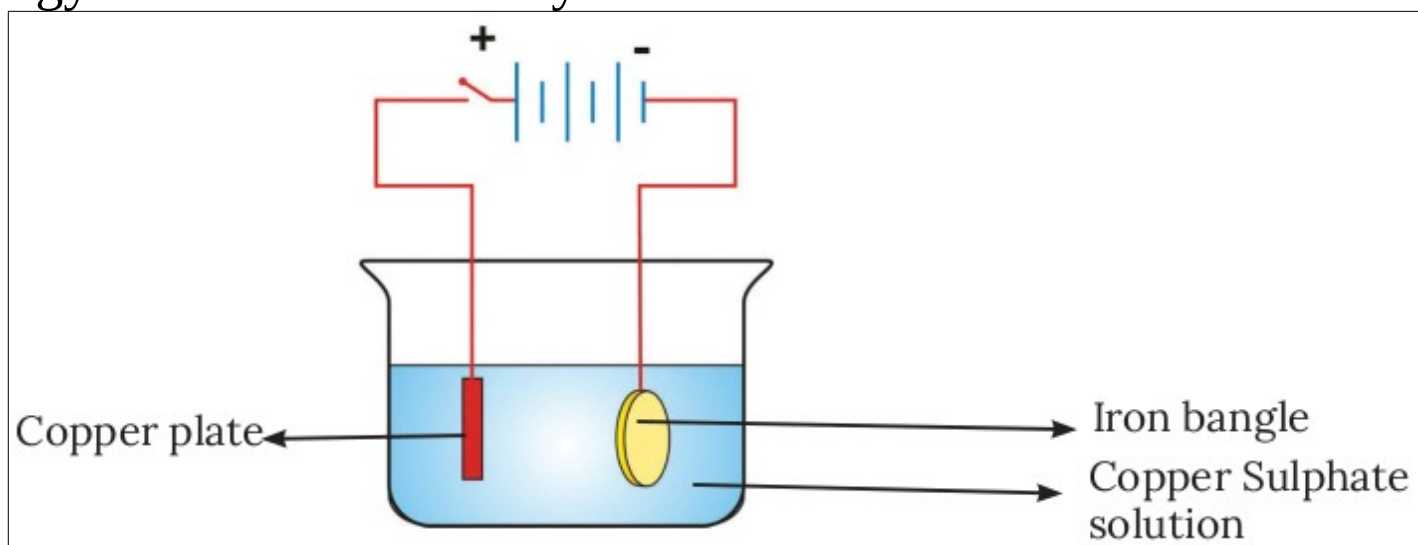
Exothermic Reactions	Endothermic Reactions
<ul style="list-style-type: none"> <li>• Reaction between potassium permanganate and glycerine</li> <li>• Reaction between magnesium and hydrochloric acid</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Decomposition of potassium permanganate</li> <li>• Reaction between ammonium chloride and barium hydroxide</li> <li>•</li> </ul>

In photosynthesis light energy is converted into chemical energy. The reactions in which light energy is absorbed or liberated are known as photochemical reactions.

Some medicines are kept in brown coloured bottles. What could be the reason?

The reason medicines are often stored in brown-colored bottles is primarily to protect the contents from light. In addition to UV protection, brown bottles can also offer some degree of protection against heat and oxygen.

In a dry cell chemical energy is converted into electrical energy. The process of dissociation of a substance by absorbing electrical energy is known as electrolysis.



Which solution is taken in the beaker? copper sulphate

To which terminal of the battery is the copper plate connected? positive

What about the bangle? negative.

When the circuit is switched on, do you notice the red colour of copper on the iron bangle? Yes.

if electrical energy is absorbed or produced during a chemical reaction, it is known as an electrochemical reaction

Chemical reaction	Major energy change
Burning of substances	Liberates heat
Decomposition of substances on heating	Absorbs heat
Bioluminescence	Liberates light
Cell made up of lemon	Liberates electrical energy
Electrolysis of sodium chloride solution	Absorbs electrical energy

## Let us assess

1. What changes in the arrangement of particles occur during the following situations?

- a) Solid changes to liquid—particles get freedom
- b) Liquid changes to gas—particles get freedom
- c) Gas changes to liquid—particles come close together.

2. Which is the main form of energy liberated/ absorbed during the given reactions? Write the type of each of these chemical reactions.

- a) Ammonium chloride and barium hydroxide react.
- b) Coating an iron bangle with copper.
- c) Glowing of Firefly.
- d) Decomposition of potassium permanganate.
- e) Lighting an LED using lemons.

- a) heat absorbed—endothermic reaction
- b) heat released—exothermic reaction
- c) heat released—exothermic reaction

d) heat absorbed - endothermic reaction

e) heat released - exothermic reaction

a) **Ammonium chloride and barium hydroxide react: Heat energy** (endothermic).

b) **Coating an iron bangle with copper: Heat energy** (exothermic)

c) **Glowing of Firefly: Light energy.**

d) **Decomposition of potassium permanganate: Heat energy** (endothermic).

e) **Lighting an LED using lemons: Electrical energy.**

3. Heat some crystals of potassium permanganate in a dry test tube. Bring a burning incense stick near the mouth of the test tube.

a) What do you observe? the **purple colour** of potassium permanganate fades.

b) Which is the gaseous product formed? Oxygen.

c) Which type of reaction is this? decomposition reaction.

4. A white cloth dipped in silver nitrate darkens when it is kept in sunlight.

a) Which form of energy is responsible for this chemical change?

b) What is the general name for this type of reaction?

a) light energy    b) photochemical reaction.

5. Sodium metal reacts with water to give new substances.

a) Which are the reactants in this reaction?

b) Which are the products formed?

a) sodium and water    b) sodium hydroxide and hydrogen.