

## CHARACTERISTICS OF PARTICLES OF MATTER

Particles of matter are constantly moving

Matter is made up of extremely small particles which cannot be seen even with a powerful microscope

Particles of matter have spaces between them

Particles of matter attract each other

The particles of matter have force acting between them, which keeps these particles together.

**Diffusion:** The spontaneous movement of particles from a region of higher concentration to a region of lower concentration

(a) The rate of diffusion increases with increase in temperature because with the increase in temperature the kinetic energy of particles increases and as a result the movement of particles increases.

(b) Solid dissolves more quickly in hot water than in cold water because diffusion occurs faster in hot water.

(b) Stronger the force of attraction, lower is the average speed, and thus lower will be the rate of diffusion.

## PHYSICAL NATURE OF MATTER

Particle Nature of Matter - Matter is made up of particles

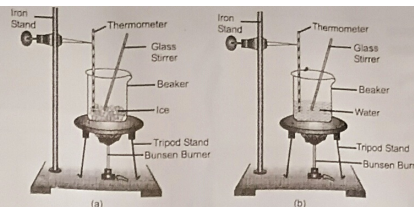
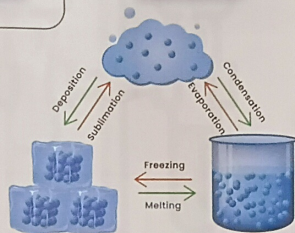
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## CAN MATTER CHANGE ITS STATE?

Inter conversion of matter can be achieved by the following two ways:

By changing the temperature

By changing the pressure

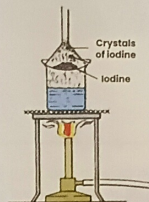


## SUBLIMATION

Sublimation is the process of conversion of a solid directly into a gas or vice-versa without changing into liquid state

Solid  $\xrightarrow{\text{Heating}}$  Vapour (or gas)  
Vapour (or gas)  $\xrightarrow{\text{Cooling}}$  Solid

Iodine crystals, Dry ice, Camphor, etc undergo sublimation.



## EFFECTS OF INCREASING TEMPERATURE

(a) Conversion of ice to water: On heating, it will be observed that first the ice (solid) melts to form water (liquid). If the heating is carried out further, the liquid (water) will change to gaseous state (vapour).

(b) Conversion of water to water vapour: The temperature at which a solid melts to become a liquid at atmospheric pressure is called its 'melting point'. This process of change of solid state into liquid state is also called 'Fusion'.

Solid  $\xrightarrow{\text{Heat}}$  liquid

## LATENT HEAT

The amount of heat required to change the state of matter from one state to another without rise in temperature is known as latent heat of that substance.

(i) Latent heat of fusion:

The amount of heat required to change the state of matter from solid state to liquid state without rise in temperature is known as latent heat of fusion.

(ii) Latent heat of vaporisation:

The amount of heat required to change the state of matter from liquid state to gaseous state without rise in temperature is known as latent heat of vaporisation.

# MATTER IN OUR SURROUNDINGS

## LIQUEFACTION OF GAS

The minimum pressure which is required to liquefy a gas at critical temperature is called 'critical pressure'. If the temperature is more than critical temperature, gas can not be liquified at any pressure.

## EVAPORATION

The phenomenon of change of a liquid into vapours at any temperature below its boiling point is called 'evaporation'. Evaporation is a surface phenomenon.

### FACTORS AFFECTING EVAPORATION

- Surface Area
- Nature of Liquid
- Humidity
- Temperature
- Speed of wind

## EFFECT OF DECREASING TEMPERATURE

(a) Change of state from liquid to solid (solidification)

Liquid  $\xrightarrow{\text{Cool}}$  Solid

(b) Change of state from gas to liquid (condensation)

Gas  $\xrightarrow{\text{Cool}}$  Liquid

(c) Change of state from liquid to gas (vaporisation)

Liquid  $\xrightarrow{\text{Heat}}$  Gas

## SOLID STATE

Matter in solid state has a definite shape and definite volume.

### Properties of Solids

Solids possess rigidity

Solids have a definite volume

Solids have a definite shape and distinct boundaries

## LIQUID STATE

The matter in liquid state has a definite volume and no definite shape.

### Properties of Liquids

Liquid do not have fixed shape but have a fixed volume.

Liquids possess fluidity

Liquids possess the property of Diffusion

(a) Rate of diffusion of different liquids: Different liquids have different rates of diffusion. For example a drop of blue or red ink diffuses faster than a drop of honey into water.

(b) Rate of diffusion increase with rise in temperature: Rate of diffusion increases with rise in temperature, hence sugar dissolves much more quickly in hot water than in cold water.

## GASEOUS STATE

The matter in gaseous state has neither definite volume nor shape.

### Properties of Gases

Gases diffuse very rapidly

Gases have low density

Gases neither have a definite shape nor a definite volume

Gases exert pressure

The Kinetic energy of particles in the gaseous state is quite high

Gases have maximum fluidity and least rigidity

Gases are highly compressible  
The spaces between particles of gases are maximum, intermediate in liquids and minimum in solids. Thus, gases are highly compressible; liquids are almost incompressible, while solids are incompressible.

