class - 9th science notes

Matter

- ***Matter is a substance which has mass and occupies space***

Example - 1. Air - We Breathe

2. Water - We Drink

3. Food - We Eat

NOTE - *Matter is made up of particles*

CHARACTERISTICS OF PARTICLES OF MATTER

- ***Particles of matter has mass***
- ***Particles of matter are very small in size***
- ***Particles of matter are continuously moving because this particles have kinetic energy***
- ***Particles of matter can intermix with each other due to diffusion***
- ***Particles of matter attract each other due to attraction force***

Diffusion

The process of inter-mixing of particles of two different types matter on their own is called diffusion.

Examples - 1. Solids , liquids and gases can diffuse into liquids

2. Liquids and gases can diffuse into liquids

3. gases can diffuse into liquids (oxygen and carbon dioxide diffuse and dissolve in water such dissolutions are essentials for the survival of aquatic animals and plants)

EFFECT OF TEMPERATURE ON DIFFUSION

- ***Diffusion depends on temperature.***
- ***If the temperature is increased then diffusion is faster.***

STATES OF MATTER

There are five states of matter

1. Solid

2. Liquid

3. Gas

4. Plasma

5. Bose-Einstein Condensate

SOLID

A solid is a substance which has definite shape and volume Example - Brick, Iron Rod , Pen , etc.

CHARACTERISTICS OF SOLID

1. Solids have definite shape

2. Solids have definite volume

3. Solids have rigid

4. Solids have negligible compressibility (because the constituent particles of a solid have negligible space between them)

5. Solids have melting point (above the room temperature)

6. Solids have boiling point (above the room temperature)

7. Solids have strong inter-particle force

8. Solids have negligible inter-particle space

9. Solids have maximum density (due to dense packing)

10. Solids have kinetic energy (lesser than liquids)

11. Solids have very slow diffusion

LIQUIDS

A liquid is a substance which has definite volume but no definite shape.

Examples*- Water , Alcohol , milk , etc.*

CHARACTERISTICS OF LIQUIDS

1. Liquids have no definite shape

2. Liquids have definite volume

3. Liquids have fluid

4. Liquids have very low compressibility

5. Liquids have melting point (below the room temperature)

6. Liquids have boiling point (above the room temperature)

7. Liquids have inter-particle force

8. Liquids have very small inter-particle space

9. Liquids have medium density

10. Liquids have kinetic energy (lesser than gases)

11. Liquids have fast diffusion

GAS

Gas is a substance which has neither a definite shape nor a definite volume .

Example - Air , Oxygen(O_2) , Nitrogen(N_2) , Hydrogen(H_2) , Methane(CH_4) , etc.

CHARACTERISTICS OF GASES

1. Gases have no definite shape

2. Gases have no definite volume

3. Gases have fluid

4. Gases have high compressibility

5. Gases have melting point (below the room temperature)

6. Gases have boiling point (below the room temperature)

7. Gases have extremely low inter-particle force 8. Gases have very large inter-particle space

9. Gases have very low density

10. Gases have kinetic energy (greater than liquids and solids)

11. Gases have very fast diffusion

PLASMA

- ***It is fourth state of matter***
- ***It consists of ionised gas containing equal number of positively charged ions and negatively electrons***
- ***The sun and stars are made up of plasma***
- ***This state of matter is used to produce fluorescent light bulb, neon sign, plasma tv etc.***

BOSE EINSTEIN CONDENSATE

- ***It is the fifth state of matter***
- ***It consists of atoms or particles that are chilled to super low temperatures so that the particles have low energy.***

SCALES OF TEMPERATURE

There are two types of scale temperature

1. Celsius scale

2. Kelvin scale

CELSIUS SCALE

- ***In this scale, the melting point of ice or lower fixed point is taken as 0° and boiling point of water or upper fixed point is taken as 100°.***

KELVIN SCALE

- ***In this scale, the length between two fixed points is also divided into 100 equal parts but melting point of water is taken 273 and boiling point of water as 373.***
- ***It is represented by ′k′***
- ***The S.I unit of temperature is ′Kelvin′***
- ***K = °C+273***

Solved Examples - 1

Example - 1: Convert the following the temperatures into kelvin scale:

1. ***57°C***
2. ***-23°C***

Solution: 1. K=°C +273 =57 + 273 = 330 K Solution: 2. K=°C=273= -23 + 273 + 250 K

Example - 2: Convert the following temperatures into Celsius scale: **(a) 300 K (b) 573 K Solution: (a) K= °C + 273 °C= K-273 =300-273=27°C (b) K= °C + 273 °C= K-273 = 573-273 = 300°C.**

CHANGE OF STATE OF MATTER

1. Melting/Fusion

2. Melting point/Fusion point

3. Latent heat of fusion

4. Boiling

5. Boiling point

6. Latent heat of vaporization

MELTING/FUSION

The process of conversion of solid into liquid on heating, without any increase in temperature, is known as fusion or melting.

MELTING/FUSION POINT

The minimum temperature at which a solid melts into liquid at atmospheric pressure, is known as the fusion or melting point.

LATENT HEAT OF FUSION

The latent heat of fusion maybe defined as the amount of heat required to change the state of a unit mass of the given solid to liquid state, at its melting point at atmospheric pressure.

BOILING

The process in which liquid changes into gas without any rise in its temperature is called boiling.

BOILING POINT

The minimum temperature at which a liquid starts boiling at atmospheric pressure is called its boiling point.

LATENT HEAT OF VAPOURIZATION

The heat required to change the state of a unit mass of liquid to gaseous state at its boiling point at atmospheric pressure, is called latent heat of vaporization.

GRAPHICAL REPRESENTATION CHANGE OF STATE

- ***The conversion of solid to liquid state = Fusion / Melting***
- ***The conversion of a liquid into solid form = Solidification / freezing***
- ***The conversion of a liquid into a gas = Vaporization***
- ***The conversion of gas into liquid = Condensation***
- ***The Conversion of solid into a gas = sublimation***
- ***The Conversion of gas into solid = Deposition***

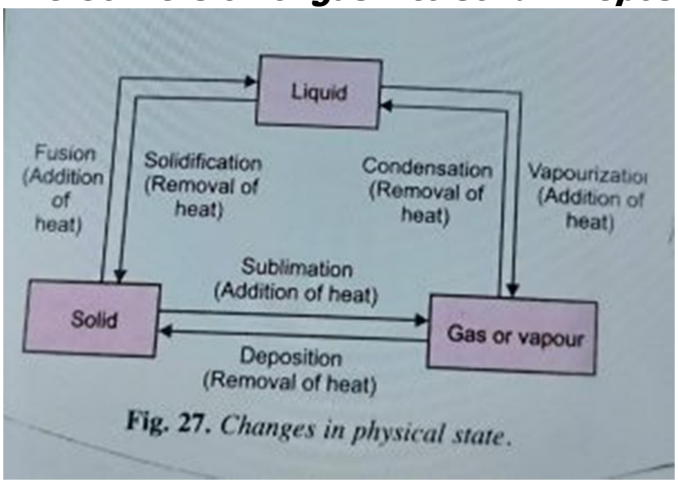

Fig. 27. *Changes in physical state.*

Evaporation

- ***Evaporation is the process of changing of a liquid into vapor below its boiling point***
- ***Evaporation is a surface Phenomenon.***

FACTORS AFFECTING EVAPORATION

Rate of evaporation increases by

- ***Increase in surface area***
- ***Increase in temperature***
- ***Decrease in humidity***
- ***increase in wind speed***

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