MATTER IN OUR SURROUNDING

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Matter :- Any things that occupy space and have mass is known as matter

Early Indian philosopheres classified matter in the form of five basic elements - the "Panch Tatva" - air, earth, fire, sky and water. According to them everything, living or non-living, was made up of these five basic elements.

Physical Nature of Matter

→ Matter is made up of tiny particles. These particles is known as atom

Characteristics of Particles of Matter.

Particles of Matter have space b/w them.

Particles of matter are continuously moving
→ The moving particles having kinetic energy which increases with increase in temperature

Particles of matter attract each other.
→ The force of attraction between the particle of matter is known as intera-molecular or interaparticle force.

Interamolecular force :- Solid > Liquid > Gas

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Brownian Motion:- The zig-zag motion of the small particles suspend in a liquid (or gas) is c/d brownian motion.

CLASSIFICATION OF MATTER

Matter can be classified into three group, on the basis of their physical properties:-

01. Solid 02. Liquid 03. Gas

Properties of Solid :-

→ Solid are rigid
→ Solid have a fixed shape & a fixed Volume
→ Solid can't Compressed much
→ have high density
→ Solid do not fill their Container Completely
→ Solid have very little space b/w their particles
→

Properties of Liquid

→ Liquid are fluid
→ Liquid have not fixed shape but fixed Volume
→ Liquid can Compressed little.
→ Liquid have intermediate density
→ Liquid do not fill their Container Completely.
→ Solid have moderate space b/w their particles.

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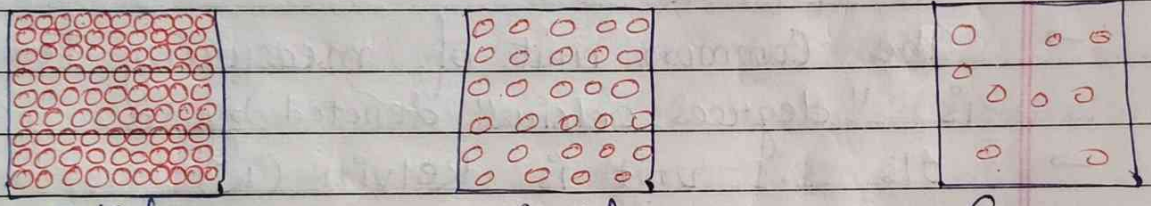
Properties of Gases

→ Gases are fluid
→ Gases have neither fixed shape nor fixed volume.
→ Gases can Compressed easily.
→ Gases have very low densities
→ Gases can fill their Container Completely.
→ Gases have large space b/w their particles.

★ The space the particles of solid, liquid & Gas



Solid Liquid Gas.

→ The space b/w the particles is c/d intera-molecular or interaparticles space.

★ Movements of particles is minimum in solid, more in liquids and maximum in Gases. (Due to interamolecular space)

DIFFUSION

The Spreading out or mixing of a substance with another substance due to the motion of its particles is c/d diffusion.

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Rate of diffusion :- Gases > Liquids > Solids.

→ The smell of food being cooked, perfume, agarbatti (incense stick), etc spread due to the diffusion.

→ The rate of diffusion increases on increasing the temperature of the diffusing substances.

Some Important Measurement

Temperature

→ The common unit of measuring temperature is "degrees celsius" denoted by °C.

→ Its S.I unit is Kelvin (K)

$0°C = 273K$ (Actual $0°C = 273.16K$)

Relation b/w Kelvin scale & Celsius scale

$$T(K) = T(°C) + 273$$

eg:- $25°C = 25° + 273 = 298\,K$

Pressure

→ Atmosphere (atm) is a unit of measuring pressure exerted by a gas.

→ The S.I unit of pressure is Pascal (Pa)

→ $1\,atm = 1.01 \times 10^5\,Pa$

→ The pressure of air in atmosphere is c/d "atmospheric pressure". The atmospheric pressure at sea level is 1 atm, and it is taken as normal atmospheric pressure.

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CHANGE OF STATE OF MATTER

Ques:- How can change in the physical State of matter ?

→ We can change the physical state of matter in two ways :

01. By changing the temperature, and
02. By changing the pressure.

01. By Changing the Temperature

i> **Melting**

→ Process in which solid Convert into liquid on heating. Also known as fusion

→ The temperature at which a solid substances melts and changes into a liquid at atmospheric pressure, is c/d melting point.

eg:- melting point of ice is 0°C (or 273K)

ii> **Boiling**

→ Process in which liquid convert into gas on heating. Also known as vaporisation.

→ The temperature at which a liquid substance boils and changes into a gas at atmospheric pressure, is c/d boiling point.

eg:- boiling point of water is 100°C (or 373K)
" " " alcohol is 78°C.

iii> **Condensation**

The process of changing a gas (or Vapour) to a liquid by cooling, is c/d Condensation.

iv) **Freezing**

The process of changing a liquid into a solid by cooling, is called freezing or solidification.

Solid $\underset{\text{cool.}}{\overset{\text{Heat}\rightarrow}{\leftarrow}}$ Liquid $\underset{\text{cool}}{\overset{\text{Heat}\rightarrow}{\leftarrow}}$ Gas

02. By changing The ~~Temperature~~ Pressure

→ Gases can be liquefied by ~~Applying~~ pressure and lowering temperature.

→ The applied pressure ~~and~~ decrease the space b/w the particles & lowering temperature decrease kinetic energy which cause to change of gas into solid.

eg:- Solid of CO_2 (Dry ice), liquid ammonia, LPG, etc.

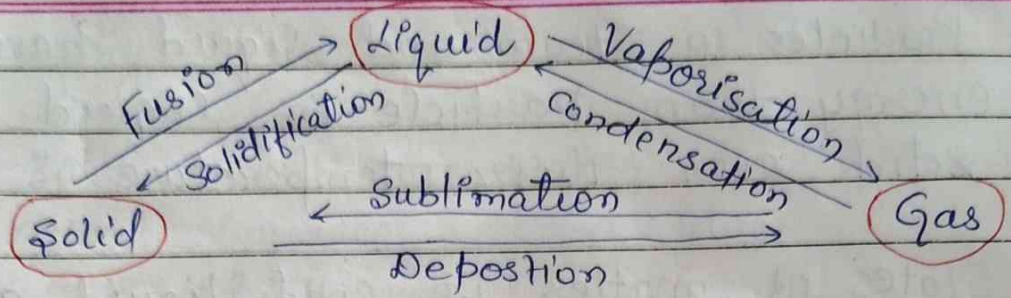
SUBLIMATION

→ The changing of solid directly into gas (or vapor) on heating and of vapour into solid on cooling, is known as sublimation.

Solid $\underset{\text{cooling}}{\overset{\text{Heating}\rightarrow}{\leftarrow}}$ Vapour (or Gas)

→ eg:- Ammonium chloride, Iodine, Camphor, Naphthalene and Anthracene

→ Also solid Carbon.



LATENT HEAT

→ Latent Means hidden

→ The heat energy which has to be supplied to change the state of a substance is c/d latent heat.

During fusion & Vaporisation, there is no any rise in temperature even we Supply Continuously heat, this heat energy goes to break the force of attraction b/w the particles and increase its kinetic energy. So, that state can change.

Latent heat is of two types :—

01. Latent heat of fusion :— The amount of heat energy that is required to change 1kg of a Solid into liquid at atmospheric pressure at its melting point is known as latent heat of fusion.

02. Latent heat of Vaporisation :— The amount of heat energy that is required to change 1kg of a liquid into gas (or vapour) at atmospheric pressure at its boiling point is known as latent heat of vaporisation.

Note:- Particles in steam and liquid have more energy than particle in liquid and solid even their temperature is same.

- States of matter i.e. solid, liquid and gas are determined by temperature & pressure.

Evaporation

A surface phenomenon in which liquid changes into vapours at any temperature below its boiling point is called evaporation.

Factors affecting evaporation :-

The rate of evaporation depends on :-

01. Surface area
02. Temperature
03. Humidity
04. Speed of air (Wind)

How does evaporation cause cooling?

Ans:- The cooling caused by evaporation is based on the fact that when a liquid evaporates, it takes latent heat of vaporization from surrounding which on losing heat get cooled.

Ques 01. Why should we wear cotton clothes in summer?

Ques 02. Why do we see water droplets on the outer surface of a glass containing ice-cold?