Class 8. 27/4/2020

MATTER: anything that occupies space,has mass,and felt by senses
E.g. table,book,air,water.
Characteristics of matter are underlined in the definitions.
Heat, sound,hate,shadow etc, are not regaded as matter as they dont have mass or can occupies space.

STATES OF MATTER

Solid, liquid,gas(gases and liquids are fluid as they can flow) all these are interconvetable with the change of conditions.

Kinetic theory of matter

(1) matters are made up of extremely small particles called molecules.
(2) molecules are in constant rapid random motion.
(3) they possess kinetic energy.
(4) molecules attract each other by cohesive or adhesive force.
(5) kinetic energy increases with increase in temperature.
(6) as the distance between the molecules increases the force between them decreases.

Sublimation

The process of converting solid directly to vapour on heating and vapour back to solid on cooling without coming to its liquid state. Example naphthalene,ammonium chloride, iodine and camphor.

Difference between gas and vapour

Substance which remain in the gaseous state at its room temperature is called gas, example hydrogen oxygen nitrogen.But those substance which changes its state to gaseous at a particular condition other than room temperature are called vapours. Example water vapour, iodine vapour,Mercury vapour.

Law of conservation of mass:

Any chemical reaction mass of the reactant is equal to mass of the product.

VIII Law of Conservation of mass:-

i.e mass of the reactant = mass of the product.

Reactant PRODUCT

$2Mg + O_2 \longrightarrow 2MgO$

Mg = 24, O = 16

Mass of the reactants (i.e $2Mg + O_2$)

$= 2 \times 24 + 16 \times 2$

$= 48 + 32$

$= 80$ u/amu

Mass of the product (i.e $2MgO$)

$= 2\{24 + 16\}$

$= 2 \times 40$

$= 80$ u/amu

Since, mass of the reactant = Mass of the Product

i.e $80 = 80$ (u/amu)

So it supports, Law of Conservation of mass.

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VIII **Law of Conservation of mass:-**

i.e. mass of the reactant = mass of the product.

Reactant — PRODUCT

$$NH_3 + HCl \rightleftharpoons NH_4Cl.$$

N - 14 ; H = 1 Cl = 35·5

Mass of the reactant i.e. NH_3 & HCl

NH_3 = Atomic mass of N x no. of times it is present + H x 3

Mass of NH_3 = $14 \times 1 + 1 \times 3$

$= 14 + 3 = 17$ u/amu

Mass of HCl = Atomic mass of H x no. of times + Cl x 1

$= 1 \times 1 + 35·5 \times 1$

$= 1 + 35·5$

$= 36·5$

So, Mass of the reactant (i.e. NH_3 & HCl)

= Mass of NH_3 + Mass of HCl.

= 17 + 36·5

= 53·5 u/amu.

Mass of the Product (i.e. NH_4Cl)

$= N \times 1 + H \times 4 + Cl \times 1$

$= 14 \times 1 + 1 \times 4 + 35·5 \times 1$

$= 14 + 4 + 35·5 \Rightarrow 53·5$ u/amu.

Mass of the reactant = Mass of the Product (i.e. 53·5 u/amu)

∴ it agrees with the L. of C of mass.

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(VIII) **Law of Conservation of mass:-**

If mass of the reactant = mass of the product.

Reactant → Product

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

Atomic mass of Ca = 40; C = 12 & O = 16.

Mass of the reactant ($CaCO_3$)

= Atomic mass of Ca × no. of times it is present + C × 1 + O × 3

= 40 × 1 + 12 × 1 + 16 × 3

= 40 + 12 + 48

= 100 u/amu (unit is u/atomic mass unit)

Mass of the Product

i.e. CaO = Ca × 1 + Oxygen × 1

= 40 × 1 + 16 × 1

= 40 + 16

= 56 u/amu

& CO_2 = C × 1 + Oxygen × 2

= 12 × 1 + 16 × 2

= 12 + 32

= 44 u/amu

∴ mass of the Product = Mass of CaO + Mass of CO_2

= 56 + 44

= 100 u/amu.

If Mass of the reactant = Mass of the Product (100 u/amu)

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(VIII) **Law of Conservation of mass:-**

i.e. mass of the reactant = mass of the product.

Reactant — PRODUCT

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Mass of the reactant i.e. NH_3 & HCl

NH_3 = Atomic mass of N × no. of times it is present + H × 3

Mass of NH_3 = 14 × 1 + 1 × 3

= 14 + 3 = 17 u/amu

Mass of HCl = Atomic mass of H × no. of times + Cl × 1

= 1 × 1 + 35·5 × 1

= 1 + 35·5

= 36·5

So, Mass of the reactant (i.e. NH_3 & HCl)

= Mass of NH_3 + Mass of HCl.

= 17 + 36·5

= 53·5 u/amu.

Mass of the Product (i.e. NH_4Cl)

= N × 1 + H × 4 + Cl × 1

= 14 × 1 + 1 × 4 + 35·5 × 1

= 14 + 4 + 35·5 ⇒ 53·5 u/amu.

Mass of the reactant = Mass of the Product (i.e. 53·5 u/amu)

∴ it agrees with the L. of C of mass.

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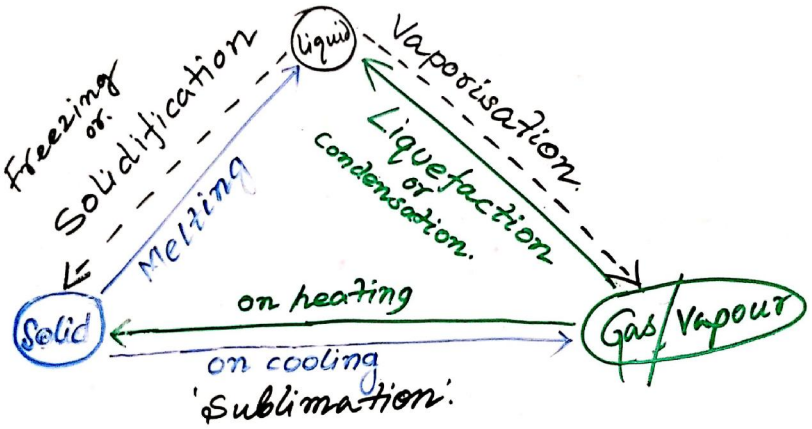
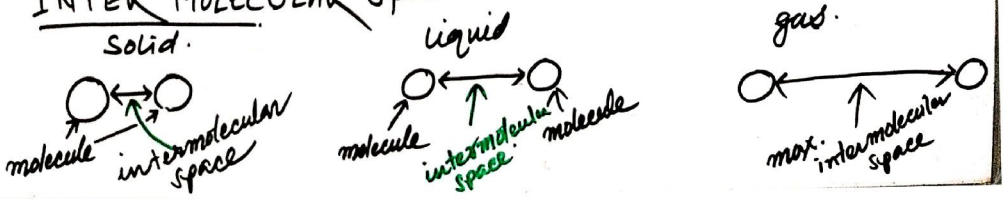
VIII

INTERCONVERSION OF MATTER



INTER MOLECULAR Space



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(viii) Importance of Interconversion of matter:-

1) Water (liq) $\xrightarrow{\Delta}$ Steam → turbine → Thermal Electricity.

2) Oxygen (gas) $\xrightarrow[\text{Under pressure}]{\text{(cooling)} \ -\Delta}$ Liq. Oxygen → Artificial Respiration

3) Kerosine (liq) → Kerosin (vapour) → Stove (Domestic Use)

4) Water (liq) $\xrightarrow{\Delta}$ Water (vapour)

- coolant → Automobile engine
- coolant → Body temperature