Kanayati® CHEMISTRY

Particulate Nature of Matter

IGCSE CAMBRIDGE

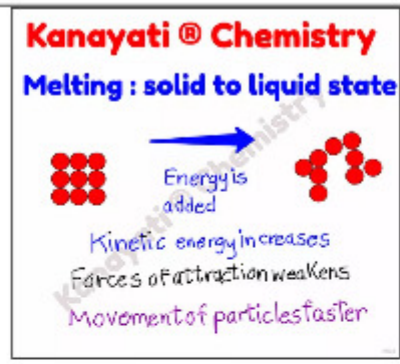
1.1.2 Changes in States Of Matter

Freezing : From liquid to solid
Melting : From solid to liquid
Boiling : From liquid to gas
Condensation : From gas to liquid
Sublimation : From Solid to gas directly
Explain the Changes of state in terms of the Kinetic Theory
To Change Matter from one physical state to another a certain amount of energy has to be absorbed or released.

The amount of energy needed depends on the strength of the attraction forces between the particles of the substance.

The stronger the forces of attraction between the particles the larger the amount of energy required.

Melting
Changing from a solid to liquid state by heating .
Heat is absorbed to break the bonds between the solid particles and change it into liquid (heat is changed into kinetic energy which makes the particles vibrate faster so it can break the bonds between them and change into liquid state).
Happens at the Melting point.



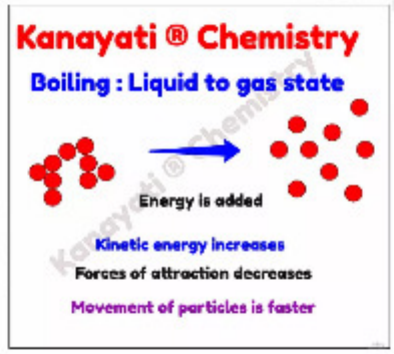
Boiling

Changing from a liquid to gas state by heating .

Occurs below the surface of the liquid.

Requires heat to be absorbed to break the bonds between the liquid particles and change it into gas (heat is changed into kinetic energy which makes the particles move faster so it can break the bonds between them and change into gas state).

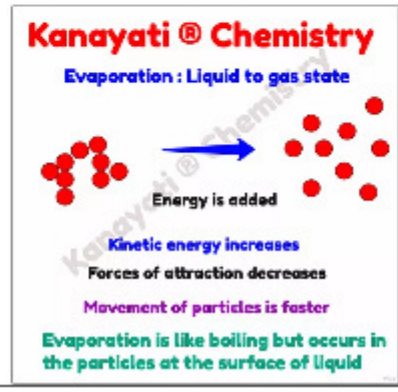
Happens at the Boiling point.



Evaporation

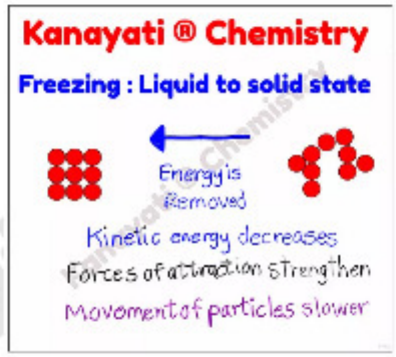
Changing from a liquid to gas state. occurs only at the surface of the liquid.

Requires heat to be absorbed to break the bonds between the liquid particles and change it into gas (heat is changed into kinetic energy which makes the particles move faster so it can break the bonds between them).

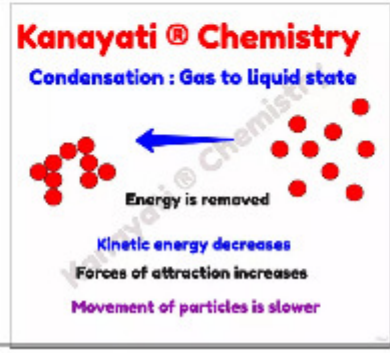


Freezing
Changing from a liquid to solid state by decreasing temperature .
Requires heat to be released (lost from system) to make new bonds between the liquid particles and change it into solid (losing heat decreases the kinetic energy of the particles which makes the particles move slower and stick together)
Happens at the Freezing point.

Note : Freezing point and Melting point has the same value
it depends only in the direction of change in state
From Solid to liquid (Melting point)
From liquid to solid (Freezing point)



Condensation
Changing from a gas to liquid state.
Requires heat to be released (lost from system) to make new bonds between the gas particles and change it into liquid (losing heat decreases the kinetic energy of the particles which makes the particles move slower)
Note that condensation is the opposite of evaporation



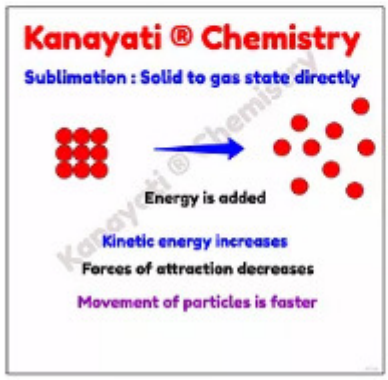
Sublimation

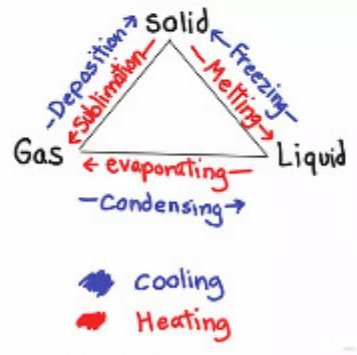
Changing from a solid to gas directly.

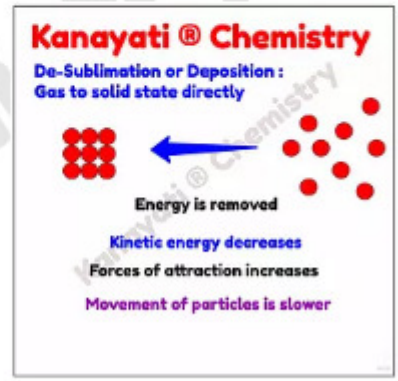
It happens in certain types of substances , and is related to the nature of the substance not to the method of heating.

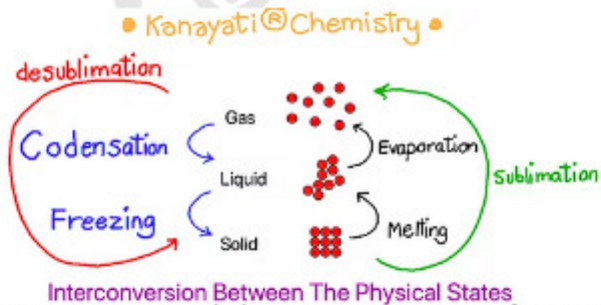
example : Solid iodine , solid carbon dioxide , solid ammonium chloride.

- The reverse reaction also happens and is also called sometimes called deposition or de-sublimation.
- Sublimation occurs at a specific temperature which is unique for a pure substance.









Interconversion Between The Physical States

Describe qualitatively the pressure and the temperature of a gas in terms of motion of its particles

As mentioned earlier the particles of gas moves rapidly and randomly in all directions this causes the particles of gas to collide with each other and with the walls of its container. this causes the particles to exert pressure.

The Higher the temperature the more rapid the particles will hit each other and collide with the walls of the container exerting higher pressure.

When the gas is compressed to a smaller volume , the particles also hit each other more frequently and hit the walls more frequently increasing the gas pressure.