

Chemistry Study Materials for Class 9

(NCERT Based notes of Chapter -01)

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MATTER IN OUR SURROUNDINGS

PROCESS OF CHANGE OF STATES OF MATTER:

- Vaporization
- Condensation
- Freezing
- Melting
- Sublimation
- Evaporation

VAPORIZATION: (CHANGE OF LIQUID INTO GAS):

The process of change of water into vapor is called vaporization. When water is heated after reaching at 100°C water starts boiling. At this temperature water turns into vapour. Since, water boils at 100°C , hence 100°C is called the boiling point of water.

BOILING POINTS

The common definition of boiling point is, the temperature at which a liquid boils is called its boiling point. Different liquid boils at different temperatures.

CONDENSATION: (CHANGE OF GAS INTO LIQUID)-

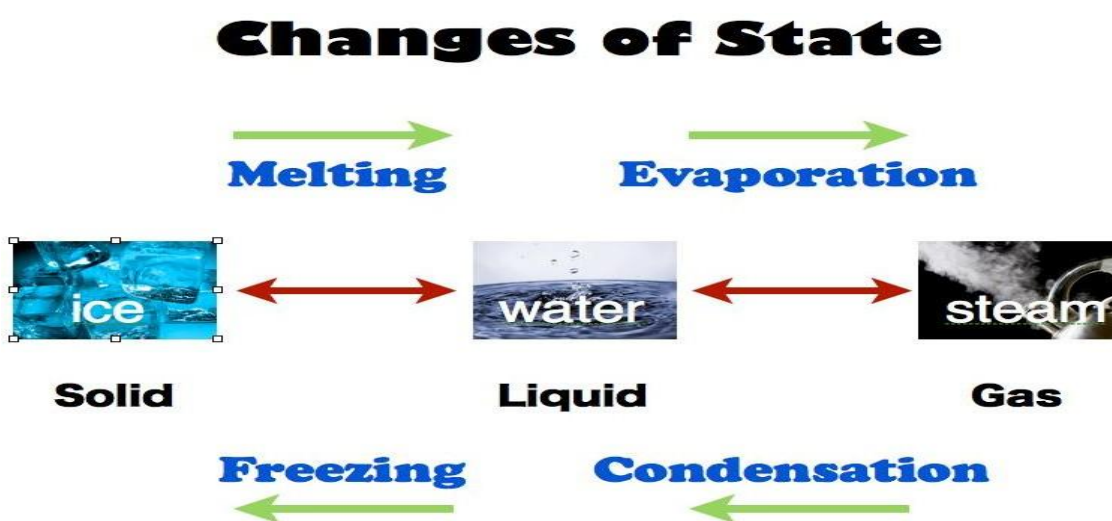
The change of vapor into water because of decrease in temperature is called condensation. Condensation is the reverse process of vaporization. When the temperature of vapor decreases it changes into water, this process is known as condensation.

Distilled water is manufactured by the condensation of vapor. The process of making of distilled water is known as distillation. In distillation first water is boiled to vaporize and the vapor is cooled, i.e. condensed to get distilled water.

FREEZING: (CHANGE OF LIQUID INTO SOLID)-

The change of liquid into solid because of decrease in temperature is called freezing. Water change into ice because of decrease in temperature, in other words water freezes into ice because of decrease in temperature. Water freezes at 0°C .

MELTING: (CHANGE OF SOLID INTO LIQUID)



The change of solid into liquid due to increase in temperature is known as melting. Ice, which is a solid melts, i.e. changes into water at 0°C .

LATENT HEAT

When water is heated up-to 100°C it starts boiling and changes into vapor. But we see that even after continuous supply of heat temperature does not rise above the 10°C while boiling of water.

Temperature supplied after 10°C to boiling water is used to change the water into vapor and temperature of water does not rise.

On the other hand we see that when heat is supplied to ice, temperature does not rise above the 0°C , until all ice melts. In this process also the heat supplied to ice after 0°C is used to change of ice into water and temperature of ice does not rise.

- Heat is used in these processes without rise in temperature is known as Latent Heat. The latent heat is used in change of states of matter, such as from solid to liquid or from liquid to gas without rising in temperature.
- Hence, Latent heat is the heat released or absorbed by a body during the process without change in temperature of the system. This happens while change of state of matter meaning a phase transition. Example - Melting of ice, boiling of water.

The particles of solid and liquid are bonded together with great force of attraction, because of which a matter exists in a particular state. When we supply heat to a solid or liquid, the heat is supplied without come in notice is used to break the force of attraction between particles and this heat is not used to increase the kinetic energy of particles. Since, kinetic energy of particles do not increase we do not see any rise in temperature of the system.

The word 'latent' is derived from the Latin word 'Latere' which means "to lie hidden". Joseph Black introduced the term Latent heat around 1762.

TYPES OF LATENT HEAT :

- Latent heat of fusion
- Latent heat of vaporization

LATENT HEAT OF FUSION (MELTING OR FREEZING):

When solid changes into liquid, the heat required changing the state without rising in temperature is called the Latent Heat of Fusion.

The change of solid to liquid state is an endothermic reaction as heat is required in it. The reaction in which heat is supplied or used is called endothermic reaction or process.

Let us take the example of melting of ice.

When heat is supplied to melt ice, temperature does not rise from 0°C even after continuous supply of heat till all ice melts. After melting of all ice temperature starts rising. The additional heat is required to melt the ice without coming into notice is the latent heat of fusion.

- The latent heat of fusion of ice is the energy which is used to change the state of ice (solid) to water (liquid).
- The quantity of heat required to convert 1 kilogram of solid to liquid without any change in temperature is called Latent Heat of fusion.
- The heat required is measured in joules (J).

3.34×10^5 joules of heat is required to convert 1 kilogram of ice into water at its melting point. Thus, the heat of fusion of ice at its melting point = 3.34×10^5 joules.
