

Class -IX (SCIENCE - CHEMISTRY)

Worksheet - 1 (Chapter - 1)

Topic - [Boiling Point and Melting point]

Boiling - The process of converting liquid into vapour (The word vapour is used to describe those gases which usually exist as liquid at room temperature) is called as boiling. It is a bulk phenomena i.e. particles from inside the liquid gain enough energy to change into vapour state. It takes place only at boiling point.

Boiling Point - The temperature at which a liquid changes into vapour or gas is

known as boiling point. Liquids turn into vapour when their vapour pressure equals the pressure of the surrounding air. A liquid's vapour pressure is the pressure exerted by a liquid when its liquid and gaseous states have reached equilibrium. The various determinants of a liquid's boiling point are -

i) surrounding pressure exerted by the earth's atmospheric layers. Water, for example, reaches the standard atmospheric pressure at 100°C. This temperature is measured at sea level, where the full weight of the earth's atmosphere presses down upon the water.

ii) Strength of intermolecular forces of attraction. For example Ethyl alcohol has a boiling point of 78.5°C at sea level and is a liquid at room temperature with strong molecular bonds. By contrast, Methyl ether has a boiling point of -25°C and is a gas at room temperature and sea level. So, Greater the forces of attraction between particles (eg. solids) higher will be the boiling point. The boiling point of water is 100°C (373 K)

Melting - The process in which solid changes into liquid is called as melting. It is

also called as fusion.

Melting Point - The temperature at which solid changes into liquid completely is called as melting point. In theory, the Melting point of solid is the same as the freezing point of a liquid. The various determinants of melting point of a solid are - i) Composition of molecules - When molecules are tightly packed a substance has a higher melting point than a substance which is not packed well.

ii) Force of attraction between molecules - Higher the melting point, strong or more will be the intermolecular forces of attraction.

iii) Presence of an impurity

Note - The three states of matter namely ; solid, liquid and gas contain particles.

The force of attraction between particles is called as intermolecular force of

attraction.

Effect of impurities on boiling point and melting point

- 1) On Boiling point - When an impurity is added to a substance, its boiling point is elevated or increases.
Reason - The increase in boiling point is due to increase in number of molecules in the solution addition to water molecules. These additional molecules absorb heat that is meant for the molecules of liquid. The impurity also blocks the water molecules which have gained energy to get vapourised. Thus a large amount of heat is required to make a liquid having impurities to boil.
- 2) On Melting point/Freezing point - When an impurity is added to a solid substance its melting point is decreased.
Reason - The impurities in solids causes a structural defects in the solids that makes the intermolecular interactions between the molecules easier to overcome and thus the impure solid requires less energy to melt and eventually the melting point of impure solids is decreased.

Assessment:

- 1 What is meant by boiling point?
- 2 What is meant by melting point?
- 3 Which of the following will have the highest boiling point? Water containing 10g of salt, water containing 20g of salt, distilled water, water containing 10g of sugar. Give reasons in support of your answer.
- 4 Why perfumes dry up if left open?
- 5 Which has a higher boiling point; water or alcohol? Give reasons.
- 6 How can you make kulfi or icecream without fridge?
- 7 How is snow removed from roads during heavy snowfalls at hill stations?
- 8 Name a solid metal whose melting point is less than boiling point of water.
- 9 Name a liquid whose melting point is -38.87°C and boiling point is 356.58°C ?
- 10 What will be the boiling point of water in a pressure cooker?
- 11 What is the effect of external pressure on boiling point of water?
- 12 Why do we prefer pressure cooker at hill stations and not ordinary containers for cooking pulses like kidney beans, gram etc.?
- 13 What is the effect of dissolving salt in water on boiling point of water?
- 14 On what factors the boiling point of a liquid depends? And How?

- 15 Which has the highest melting points
Iron, Aluminium, Copper, Silver? And why?
- 16 Why is boiling a bulk phenomenon?
- 17 How will you determine the melting point of ice
experimentally with the help of a neat and labelled diagram?
- 18 How will you determine the boiling point of water
experimentally? Draw a neat and labelled diagram.
- 19 Write an activity to show that water can be made to boil
even at a temperature below its normal boiling point (100°C).
- 20 You are given two substances X and Y. One of them is pure
water and another is impure water. How will you identify
which one is pure water?