Chemistry Study Materials for Class 9 (NCERT Based notes of Chapter -01)

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MATTER IN OUR SURROUNDINGS

Q2. (a) Tabulate the differences in the characteristics of states of matter.

Answer: The differences in the characteristics of states of matter are given in the following table.

S. No	Solids	Liquids	Gases
1	Definite shape and volume.	No definite shape. Liquids attain the shape of the vessel in which they are kept.	Gases have neither a definite shape nor a definite volume.
2	Incompressible	Compressible to a small extent.	Highly compressible
3	There is little space between the particles of a solid.	These particles have a greater space between them.	The space between gas particles is the greatest.
4	These particles attract each other very strongly.	The force of attraction between liquid particles is less than solid particles.	The force of attraction is least between gaseous particles.
5	Particles of solid cannot move freely.	These particles move freely.	Gaseous particles are in a continuous, random motion.

Q2.Comment upon the following: rigidity, compressibility, fluidity, filling a gas container, shape, kinetic energy and density.

Answer:

(i) Rigidity The property due to which an object retains its shape and size is known as rigidity. Solids are rigid whereas liquids and gases are not.

(ii) Compressibility: Compressibility is the property; due to which a substance can be compressed, *i.e.*, its volume can be decreased. Gases are compressible whereas solids and liquids are not.

(iii) Fluidity The property due to which a substance tends to flow is called fluidity. Gases and liquids are fluids, solids are not.

(iv) Filling a gas container A gas can be filled in a gas container by compressing it under high pressure. The property of compressibility (of gases) helps them in this regard.

(v) Shape The property of having a definite geometry is called shape of a particular substance. Solids have a definite shape whereas gases and liquids do not have.

(vi) Kinetic energy The energy possessed by an object or by the molecules of an object due to its state of motion is called kinetic energy. Molecules of gases posses highest kinetic energy. Increasing the temperature also increases the kinetic energy of a substance (or its molecules).

(vii) Density The mass per unit volume of a substance is called density.

Q3. Give reasons

(a) A gas fills completely the vessel in which it is kept.

Answer: There is little attraction between particles of gas. Thus, gas particles move freely in all directions. Therefore, gas completely fills the vessel in which it is kept.

(b) A gas exerts pressure on the walls of the container.

Answer: Particles of gas move randomly in all directions at high speed. As a result, the particles hit each other and also hit the walls of the container with a force. Therefore, gas exerts pressure on the walls of the container.

(c) A wooden table should be called a solid.

Answer: A wooden table has a definite shape and volume. It is very rigid and cannot be compressed i.e., it has the characteristics of a solid. Hence, a wooden table should be called a solid.

(d) We can easily move our hand in air but to do the same through a solid block of wood we need a karate expert.

Answer: Particles of air have large spaces between them. On the other hand, wood has little space between its particles. Also, it is rigid. For this reason, we can easily move our hands in air, but to do the same through a solid block of wood, we need a karate expert.

Q4. Liquids generally have lower density as compared to solids. But you must have observed that ice floats on water. Find out why.

Answer: The mass per unit volume of a substance is called density (density = mass/volume). As the volume of a substance increases, its density decreases. Though ice is a solid, it has large number of empty spaces between its particles. These spaces are larger as compared to the spaces present between the particles of water. Thus, the volume of ice is greater than that of water.

Hence, the density of ice is less than that of water. A substance with lower density than water can float on water. Therefore, ice floats on water.

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