Matter around us

Size of the particles of the matter

A particle is a minute fragment or quantity of matter. In the physical, a particle is a small localized object to which can be ascribed several physical or chemical properties such as volume or mass. They vary greatly in size from subatomic particles like the electron to microscopic particles like atoms and molecules to macroscopic particles like powders and other granular materials. Particles can also be used to create scientific models of even larger objects, such as humans moving in a crowd.

Physical nature of matter

They include properties such as color, length, volume, odor, and density. These properties are extensive if they depend on the amount of the substance being used or intensive if they do not depend on the amount of substance being used.

Physical properties of matter

Physical properties of matter can be observed and tested. They include

1. volume
2. mass
3. density
4. colour
5. odour

Properties of Matter

Every substance has a unique set of properties and they can be divided into two categories: Physical and Chemical Properties.

Physical properties are those properties which can be measured or observed without changing the identity or the composition of substance. For ex. Colour, Odour, Melting Point, Boiling Point, Density etc.

Chemical properties on the other hand, require a chemical change to occur. The examples of chemical properties are characteristic reactions of different substances; these include acidity, combustibility etc.

Solid state

Matter in the solid state maintains a fixed volume and shape, with component particles (atoms, molecules or ions) close together and fixed into place.In solid state, molecules are compact and they move /vibrate about their mean position, So the inter-particle space is minimum consequently their inter-particle force of attraction is maximum.

Examples are apple, pen, pillow are said to be in solid state.

Liquid state

Matter in the liquid state maintains a fixed volume, but has a variable shape that adapts to fit its container. Its particles are still close together but move freely.In liquid state, molecules can move within the liquid , So their inter-particle space is more compared to solid and their interparticle force of attraction is less compared to solid.

Examples are water, coffee, beverages are said to be liquid state

Gaseous state

Matter in the gaseous state has both variable volume and shape, adapting both to fit its container. Its particles are neither close together nor fixed in place.In gaseous state, molecules are free to move in any direction ,So their inter-particle space is maximum and their interparticle force of attraction is least. Examples are water vapour, nitrogen, oxygen are said to be gaseous state.

Space between particles

In solids,they are not easily compressible and have little free space between particles.
In liquids,they are not easily compressible and have little free space between particles.
In gases,they are compressible and have lots of free space between particles.

Reason behind continous motion of particles

Particles of matter are continuously moving. They possess the kinetic energy. As the temperature rises, kinetic energy increases and particles moves faster.

Forces of attraction

In liquids,The intermolecular attractive forces are strong enough to hold molecules close together
In solids, The intermolecular forces between neighboring molecules are strong enough to keep them locked in position.
In gases, The lack of any significant attractive force between molecules allows a gas to expand to fill its container.

Diffusion

Diffusion refers to the process by which molecules intermingle as a result of their kinetic energy of random motion. Consider two containers of gas A and B separated by a partition.The molecules of both gases are in constant motion and make numerous collisions with the partition.

Diffusion

1. Diffusion refers to the process by which molecules of matters move from high concentration towards the low concentration.
2. For example, when a sugar cube is dropped in a glass of water the particles of sugar mixes up in the water as they move from higher concentration of sugar cube towards the lower concentration of water.

Change of state of matter

1. States of matter are inconvertible by applying Heat and pressure to them.
2. When solids are heated the inter molecular force of attraction between particles decreases and they converts into liquids.
3. Liquids on further heating converts into gases .
4. Gases are invisible , do not have any fixed shape and volume because inter molecular force of attraction become zero.

Vaporisation

Conversion of liquid state in the gaseous state in water is called vaporisation.

Melting point

The temperature at which a given material changes from a solid to a liquid, or melts is called as its melting point. Example : Ice melts at 32o Fahrenheit or 00 Celsius.

Vapourisation

Vaporization of an element or compound is a phase transition from the liquid phase to vapor. Boiling point is the temperature at which liquid changes to vapor. Examples: Boiling of water.Water changes to water vapor at 1000C which is melting point of water

Freezing

Freezing, or solidification, is a phase transition in which a liquid turns into a solid when its temperature is lowered below its freezing point.Freezing point is the temperature at which liquid changes to solid

Liquid water turning to ice is an example of freezing.

Freezing point of water is 00C

Interconversion of matter

The state of matter are inter convertible. The state of matter can be changed by applying pressure and temperature .

Sublimation

Sublimation is the transition of a substance directly from the solid to the gas phase without passing through the intermediate liquid phase.

Sublimation

The change from solid state to vapour state without passing through the liquid state is called sublimation and the substance is said to sublime. Dry ice (solid CO_2) and iodine sublimes.