

Chapter 1: Matter

1. Main Postulates of Kinetic Molecular Theory of Matter

- Matter is made up of tiny particles (atoms or molecules).
- These particles are always in constant motion.
- The speed of particles increases with an increase in temperature.
- There are spaces between the particles of matter.
- Particles attract each other; the strength of attraction varies in solids, liquids, and gases.

2. Change of State of Matter (Inter-Particle Space & Attraction)

- **Solid to Liquid (Melting):** When heated, particles gain energy, move faster, and overcome strong inter-particle forces, increasing space between them.
- **Liquid to Gas (Evaporation/Boiling):** Further heating weakens inter-particle attraction, increasing movement and space, causing liquid to become gas.
- **Gas to Liquid (Condensation):** Cooling reduces particle energy, decreasing movement and increasing attraction, turning gas into liquid.
- **Liquid to Solid (Freezing):** Further cooling increases inter-particle attraction, reducing movement and space, forming a solid.
- **Sublimation:** Some solids directly change into gas (e.g., camphor, dry ice) due to weak inter-particle attraction.

3. Law of Conservation of Mass

Statement: "Mass can neither be created nor destroyed in a chemical reaction."

Explanation: The total mass of reactants is always equal to the total mass of products in a closed system.

Example:

- When 10g of calcium carbonate (CaCO_3) decomposes, it forms calcium oxide (CaO) and carbon dioxide (CO_2), but the total mass remains the same.
- $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
- **Mass before reaction = Mass after reaction**

This law proves that atoms are rearranged but not lost during chemical changes.