

Chapter 3 - Atoms and Molecules

Summary of Atoms and Molecules

- Law of conservation of mass: According to this law, during any physical or chemical change, the total mass of the products remains equal to the total mass of the reactants.
- Law of constant proportion: Another French chemist, Joseph Proust, stated this law as 'A chemical compound always contains same elements combined together in the same proportion by mass'.
- Law of multiple proportion: John Dalton (1803) stated this law as 'when two elements combine with each other to form two or more than two compounds, the mass of the element which combine with the fixed mass of the other bears a simple whole number ratio'.
- Some important formulae:

- Percentage composition of an element
$$= \frac{\text{Total weight of element in a molecule}}{\text{Gram molecular weight}} \times 100$$

- $$n = \frac{\text{Molecular weight}}{\text{Empirical formula weight}}$$

- $$\text{RMM} = \frac{\text{Mass of one molecule of the substance}}{(\frac{1}{12}) \text{Mass of the atom of carbon (C}^{12}\text{)}}$$

- $$\text{Gram molecular volume} = \frac{\text{Gram molecular weight}}{\text{Weight/volume of gas at STP}}$$

- $$1 \text{ mole} = \frac{\text{Mass of a substance}}{\text{Gram atomic mass}}$$