Formula Mass: The mass of the smallest unit of the compound is the formula mass, which is the sum of the atomic masses of all the atoms present.

- Molecular mass is used to represent the mass of a unit of a compound, formula mass is preferred because ionic and network solids do not form discrete molecules
- EX: NaBr is an ionic compound. No molecules of NaBr exist as molecular mass does not apply to NaBr. However, formula mass can be calculated for a formula unit of the compound. The formula mass of NaBr is the mass of 1 atom of Ba plus the mass of 1 atom of Br in amu.

Gram Formula Mass: The gram formula mass of a substance is the formula mass expressed in grams instead of amu. The G.F.M of K2CO3 is 138.2g. It is common to express the gram formula masses of molecular substances as gram molecular mass.

Percentage Composition: Using the subscripts and atomic masses of the elements, the percent by mass of a substance can be calculated. The percentage composition of a substance represents the composition as a percentage of each element compared with the total mass of the compound

Hydrates: Crystals that contain attached water molecules are hydrates, while substances without water are termed anhydrous. If it is necessary to calculate the percentage of water in such a crystal, treat the water molecule as a single unit

Mole: Defined as the number of atoms of carbon present in 12 grams of C-12

Avogadro's Number: 6.02 x 10^{23} : Number of particles in a mole of a substance

Moles to Gram: # of moles * G.F.M./1 mol

Gram to mole: grams * 1 mol/G.F.M.

Finding Molecular Formula from Empirical Formula

Step 1: Determine the molecular mass in grams.

Step 2: Divide the molecular mass of the compound (μ) by the molecular mass (g) of the empirical formula.

Step 3: Round the quotient to the closest integer.

Step 4: Multiply the rounded number by all the subscripts, using the product as the new subscripts.

Example: A compound has an empirical formula of CH2 and a molecular mass of 42μ. Determine its molecular mass.

Step 1: Carbon = 12 + Hydrogen = 2(1.01)

Molecular Mass (g) = 14.02

Step 2: 42 ÷ 14.02 = 2.999

Step 3: 3

Step 4: CH2 • 3 = C3H6

Mole Relations in Balanced Equations: In chemical reactions, the relative amounts of reactants and products are represented by the coefficients. Coefficients represent both the basic unit and mole ratios in balanced equations

Avogadro's Hypothesis: At STP, 22.4 liters of any gas contains 6.02 x 10^{23} ***molecules.***

Mol: 6.02 x 10^{23} molecules of any substance

- **Ionic Bonds use formula units**
- **Gram Molecular Mass:** Can not use for ionic and network formula
- **Formula Mass:** The sum of the masses of all atoms in a formula. IN AMU