

ATOMS AND MOLECULES

Chemical formula

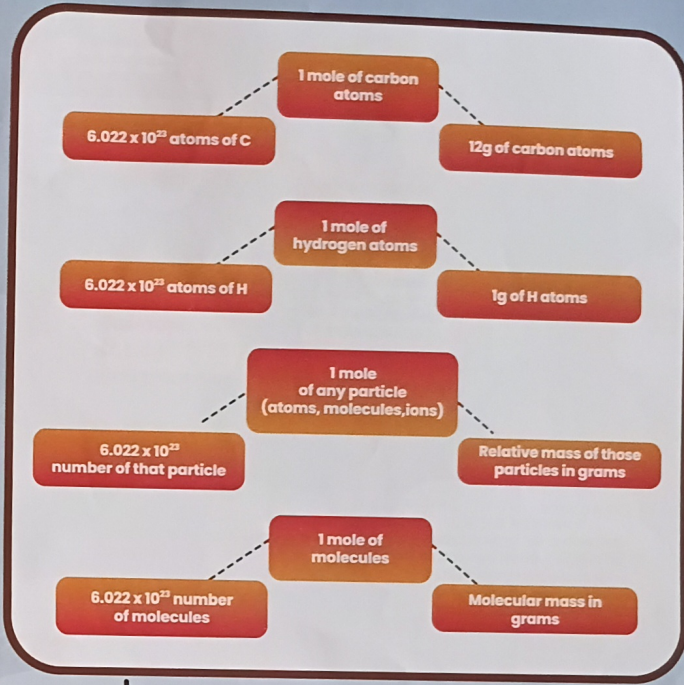
The chemical formula of a compound is a symbolic representation of its composition.

The combining power (or capacity) of an element is known as its valency. Some elements show more than one valency.

Formula of hydrogen sulphide
 Symbol $\begin{matrix} H & S \\ \diagdown & / \\ 1 & 2 \end{matrix}$
 Valency
 Formula: H_2S

A group of atoms carrying a charge is known as a polyatomic ion.

Polyatomic ion



MOLE CONCEPT

1. The number of moles

$$= \frac{\text{Given mass}}{\text{Molar mass}}$$

$$n = \frac{m}{M}$$

2. The number of moles

$$= \frac{\text{Given number of particles}}{\text{Avogadro number}}$$

$$n = \frac{N}{N_A}$$

The mole, symbol mol, is the SI unit of the amount of substance. One mole contains exactly $6.02214076 \times 10^{23}$ elementary entities. This number is the fixed numerical value of the Avogadro constant, N_A , when expressed in the unit mol^{-1} and is called the Avogadro number.

The mass of 1 mole of a substance is equal to its relative atomic or molecular mass in grams. For example, the atomic mass of hydrogen = 1u. So, the gram atomic mass of hydrogen = 1 g.

FORMULA UNIT MASS

The formula unit mass of a substance is the sum of the atomic masses of all atoms in a formula unit of a compound.

For example, sodium chloride has a formula unit NaCl. Its formula unit mass can be calculated as:
 $(1 \times 23) + (1 \times 35.5)$
 $= 58.5u$

Valency	Name of ion	Symbols	Non-metallic element	Symbols	Polyatomic ions	Symbols
1.	Sodium	Na^+	Hydrogen	H^+	Ammonium	NH_4^+
	Potassium	K^+	Hydride	H^-	Hydroxide	OH^-
	Silver	Ag^+	Chloride	Cl^-	Nitrate	NO_3^-
	Copper (I)*	Cu^+	Bromide	Br^-	Hydrogen carbonate	HCO_3^-
			Iodine	I^-		
2.	Magnesium	Mg^{2+}	Oxide	O^{2-}	Carbonate	CO_3^{2-}
	Calcium	Ca^{2+}	Sulphide	S^{2-}	Sulphite	SO_3^{2-}
	Zinc	Zn^{2+}			Sulphate	SO_4^{2-}
	Iron (II)*	Fe^{2+}				
	Copper (II)*	Cu^{2+}				
3.	Aluminium	Al^{3+}	Nitride	N^{3-}	Phosphate	PO_4^{3-}
	Iron (III)*	Fe^{3+}				