
Mole fraction in physical chemistry

Ratio of number of moles of one component to total number of moles of all components

Expression for mole fraction

$$x_{\text{component}} = \frac{n_{\text{component}}}{n_{\text{total}}}$$

Expression for mole fraction of solute in a solution

$$x_{\text{solute}} = \frac{n_{\text{solute}}}{n_{\text{solute}} + n_{\text{solvent}}}$$

Expression for mole fraction of solvent in a solution

$$x_{\text{solvent}} = \frac{n_{\text{solvent}}}{n_{\text{solvent}} + n_{\text{solute}}}$$

Affect of temperature on mole fraction

Null

Mass fraction in physical chemistry

Ratio of mass of component to total mass of solution

Expression for mass fraction of solute in a solution

$$\text{Mass fraction of solute} = \frac{m_{\text{solute}}}{M_{\text{solution}}}$$

Expression for mass fraction of solvent in a solution

$$\text{Mass fraction of solvent} = \frac{m_{\text{solvent}}}{M_{\text{solution}}}$$

Affect of temperature in mass fraction

Null

Parts per million in physical chemistry

Number of parts by weight of a solute per million parts by weight of solution

Parts per billion in physical chemistry

Number of parts by weight of solute per billion parts by weight of solution

Expression for parts per million in physical chemistry

$$ppm = \frac{w_{solute}}{W_{solvent}} \times 10^6$$

Expression for parts per billion in physical chemistry

$$ppb = \frac{w_{solute}}{W_{solvent}} \times 10^9$$