

osmotic coefficient, ϕ

Quantity characterizing the deviation of the solvent from ideal behaviour referenced to Raoult's law. The osmotic coefficient on a molality basis is defined by:

$$\phi = \frac{\mu_{\text{A}}^* - \mu_{\text{A}}}{R T M_{\text{A}} \sum_i m_i}$$

and on an amount fraction basis by:

$$\phi = \frac{\mu_{\text{A}}^* - \mu_{\text{A}}}{R T \ln x_{\text{A}}}$$

where μ_{A}^* and μ_{A} are the chemical potentials of the solvent as a pure substance and in solution, respectively, M_{A} is its molar mass, x_{A} its amount fraction, R the gas constant and T the temperature. The latter osmotic coefficient is sometimes called the rational osmotic coefficient.

Source:

Green Book, 2nd ed., p. 51

PAC, 1994, 66, 533 (*Standard quantities in chemical thermodynamics. Fugacities, activities and equilibrium constants for pure and mixed phases (IUPAC Recommendations 1994)*) on page 546