

Answer on Question#49298 – Chemistry, Physical Chemistry

Mole fraction of the solute in a 1.00 molal aqueous solution is

- (1).177
- (2).0177
- (3).0344
- (4)1.7700

Solution:

$$b = \frac{v}{m_{\text{solvent}}}; \text{ b – the molality (mol/kg); v - the mole (mol); m – the mass of the solvent (kg);}$$

If $m=1$ kg, then $v(\text{solute})=1$ mol;

$$M(\text{H}_2\text{O})=18 \text{ g/mol}; m(\text{H}_2\text{O})=1 \text{ kg}; v(\text{H}_2\text{O}) = \frac{m(\text{H}_2\text{O})}{M(\text{H}_2\text{O})}; v(\text{H}_2\text{O})=55.56 \text{ mol};$$

$$x_i = \frac{v_i}{v_{\text{tot}}}; x_i \text{ – the mole fraction; } v_{\text{tot}} \text{ -the total amount of all constituents in a mixture (mol);}$$

$$x(\text{solute}) = \frac{v(\text{solute})}{v(\text{solute}) + v(\text{H}_2\text{O})};$$

$$x(\text{solute})=0.0177$$

Answer: (2).0177