

Answer on Question #83590 – Chemistry – Other

Task:

Calculate the molality of ethanol in a solution that which contains 55 g of ethanol in 0.42 kg of water. The molar mass of ethanol is 46 g/mol.

Solution:

$$\text{Molality}(m) = \frac{\text{Moles of Solute}}{\text{Kilograms of Solvent}}$$

$$\text{Moles of Solute} = n(\text{ethanol}) = \frac{m(\text{ethanol})}{M(\text{ethanol})};$$

$$\text{Moles of Solute} = \frac{55 \text{ g}}{46 \text{ g/mol}} = 1.19565 \text{ moles of ethanol.}$$

$$\text{Kilograms of Solvent} = m(\text{H}_2\text{O}) = 0.42 \text{ kg.}$$

Then,

$$\text{Molality}(m) = \frac{1.19565 \text{ mol}}{0.42 \text{ kg}} = 2.8468 \text{ mol/kg}$$

Answer: The molality of ethanol in a solution = 2.8468 mol/kg.