

Solutions - 9 Raoult's law - 2 Bpt - Elevation

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Calculate the bpt elevation of a solution of 685g ethylene glycol ($\text{CH}_2\text{OHCH}_2\text{OH}$; MW 62.07g/mol) in 2075g H₂O. ($K_b\text{H}_2\text{O} = 0.52^\circ\text{C/m}$)

$$\Delta T_b = k_b m$$

$$m = \frac{\text{mol solute}}{\text{kg solvent}} = \frac{685\text{g}}{2075\text{g}/1000} = \underline{\underline{2.075\text{kg}}} \\ \frac{11.04\text{mol}}{2.075\text{kg.}} = 5.32\text{m}$$

$$\Delta T_b = 0.52^\circ\text{C/m} \times 5.32\text{m}$$

$$\text{change in } \overline{T} = 2.8^\circ\text{C}$$

$$\text{new Bpt} = 100 + 2.8^\circ\text{C} \quad \boxed{102.8^\circ\text{C}}$$