TOPIC 4.
CLASSWORK

Example 1. A saline solution is prepared by dissolving 5.85 g of sodium chloride (NaCl) in 250 g of water. Calculate the vapor pressure lowering of water at 25°C, assuming the vapor pressure of pure water is 23.8 mmHg. Assume complete dissociation of NaCl and that NaCl dissociates into 2 ions (Na+ and Cl−). Molar mass of NaCl=58.44 g/mol.

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ANSWER: _____

Example 2. A solution is prepared by dissolving a non-volatile solute in 500g of water. The vapor pressure of the solution at 25°C is measured to be 23.4mmHg, while the vapor pressure of pure water is 23.8 mmHg. If the molar mass of the solute is 120g/mol, calculate the mass of the solute in the solution.

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Example 3. A saline solution is prepared by dissolving 10g of sodium chloride (NaCl) in 500g of water. Assuming complete dissociation of NaCl into 2 particles (Na+ and Cl−), calculate the boiling point of the solution. The boiling point elevation constant (Kb) for water is 0.52 °C/mole/kg, and the molar mass of NaCl is 58.44g/mol. The normal boiling point of water is 100.0°C.

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Example 4. A solution has a boiling point of 100.26℃. It was prepared by dissolving a non-volatile solute in 400g of water. The boiling point elevation constant (Kb) for water is 0.52 °C/mole/kg, and the molar mass of the solute is 120g/mol. Calculate the mass of the solute in the solution.

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ANSWER: _____

Example 5. A solution is prepared by dissolving 10g of glucose ($C_6H_{12}O_6$) in 200g of water. Calculate the freezing point of the solution. The freezing point depression constant (Kf) for water is 1.86°C/mole/kg, and the molar mass of glucose is 180g/mol. Assume glucose does not dissociate in water.

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ANSWER: _____

Example 6. A solution is prepared by dissolving 12g of an unknown solute in 300g of water. The freezing point of the solution is measured to be $-1.24°C$. The freezing point depression constant (Kf) for water is $1.86°C/mole/kg$. Calculate the molar mass of the unknown solute.

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