Chemistry: *Colligative Properties – Freezing Point Depression*

1. How much will the freezing point be lowered if enough sugar is dissolved in water to make a 0.50 molal solution?

2. What is the freezing point of a solution of a nonelectrolyte dissolved in water if the concentration of the solution is 0.24 *m*?

3. What is the freezing point of a solution that contains 68.4 g of sucrose, $C_{12}H_{22}O_{11}$, dissolved in 1.00×10^2 g of water?

4. Suppose that 98.0 g of a nonelectrolyte is dissolved in 1.00 kg of water. The freezing point of this solution is found to be –0.465°C. a. what is the molality of this solution?   b. How many moles of the solution do you have? c. What is the molar mass of the solute?

5. A researcher places 53.2 moles of an unknown nonelectrolyte in 505 g napthalene. The nonelectrolyte lowers napthalene's freezing point by 8.8°C. Solve for Kfp for this substance.

Chemistry: *Colligative Properties – Boiling Point Elevation*

1. A given solution contains 8.10 g of a nonelectrolyte in 300 g of water. It boils at 101.2°C. What is the gram molecular mass of the solute?

2. The molal boiling point constant for ethyl alcohol is 1.22 °C/molal. Its boiling point is 78.4°C. A solution of 14.2 g of a nonvolatile nonelectrolyte in 264 g of the alcohol boils at 79.8°C. What is the molality of this substance? How many moles of solute do you have? What is the gram molecular mass of the solute?

3. A nonelectrolyte raises the boiling point of water to 100.78°C at 101.3 kPa when 51 g of the compound is dissolved in 500 g of water. How many moles of this substance are you using, and what is its molar mass?

4. Suppose that 13 g of $MgCl_2$ is dissolved in 0.50 kg of water. What is the new boiling point of the water?