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for example the boiling point of pure water at 1 0atm is 100oc while the boiling point of a 2 saltwater solution is about 102oc therefore the boiling point elevation would be 2oc the freezing point depression is the amount that the freezing temperature decreases under certain conditions water may remain a liquid as cold as 40 to 42 f how can water remain a liquid so far below its usual freezing point the answer is that water needs a seed crystal or other small particle nucleus on which to form crystals the freezing point of water is 32 degrees fahrenheit 0 degrees celsius and 273 15 kelvin do you know the freezing point of water is the freezing point the same as the melting point here is a look at the temperature of the freezing point the factors that affect it and whether it s identical to the melting point solution to find the temperature change elevation of a solvent by a solute use the freezing point depression equation Δt ik f m where Δt change in temperature in c i van t hoff factor k f molal freezing point depression constant or cryoscopic constant in c kg mol m molality of the solute in mol solute kg solvent freezing point 5 49 c cryoscopic constant k f 5 12 c kg mol 1 2a we need to determine how many moles of acetic acid were dissolved Δt i k f m 2 03 c 1 5 12 c kg mol 1 x 0 0800 kg 2 03 c 64 c mol 1 x x 0 031719 mol note the use of 1 for the van t hoff factor possible answers 40g of c6h12o6 10g of ba oh 2 50g of k2o 25g of nacl correct answer 10g of ba oh 2 explanation we are looking for the least amount of freezing point depression freezing point depression is calculated using the equation Δtf kfim each of these solutions has a different molality which needs to be calculated 1 what is a liquid s freezing point ans the level a liquid is freezing at is its freezing point 2 do all liquids have a freezing point ans liquids have a temperature characteristic at which they become solids known as their freezing point theoretically a solid s melting point should be the same as the liquid s freezing point boiling point elevation is the raising of a solvent s boiling point due to the addition of a solute similarly freezing point depression is the lowering of a solvent s freezing point due to the addition of a solute in fact as the boiling point of a solvent increases its freezing point decreases solution Δt i k f m 1 32 c 1 5 12 c kg mol 1 x 0 0273 kg 1 32 c 187 5458 c mol 1 x x 0 007038 mol freezing point depression is a colligative property observed in solutions that results from the introduction of solute molecules to a solvent freezing point depression osmotic pressure molarity molality and other concentrations practice problems practice 1 vapor pressure lowering calculate the vapor pressure of a solution at 25 c that is made by adding 47 9 g of glucose c 6 h 12 o 6 to 340 0 ml of water the addition of one mole molecular weight in grams of any nonionic does not form ions solute to 1 000 grams of water lowers the freezing point of the water by 1 885 c and this has been used as an accurate method for determining molecular weights solutions freezing point depression video tutorials practice problems previous topic boiling point elevation next topic osmosis on a tight schedule get a 10 bullets summary of the topic get topic summary quiz freezing and boiling points cliffsnotes study guides are written by real teachers and professors so no matter what you re studying cliffsnotes can ease your homework headaches and help you score high on exams access quality crowd sourced study materials tagged to courses at universities all over the world and get homework help from trial 2 step 1 finding delta t freezing point of pure cyclohexane delta t of pure cyclohexane 7 c 2 4 c step 2 finding molality kf of cyclohexane 20 c mol m deltat kf m 4 c 20 c m m 0 step 3 finding moles of biphenyl solute mol mol kg kg mol 0 mol kg 0 0 step 4 molar mass of biphenyl solute 2 441g 2 0 0 062g 0 125 Δtf i kf m where Δt f is the freezing point depression i is the van t hoff factor k f is the cryoscopic constant and m is the molality freezing point depression in solutions as per raoult s law the vapour pressure of a pure solvent decreases with the addition of a solute transcribed image text part 1 freezing point depression if you dissolve a substance such as ordinary table salt nacl in water the freezing point of the water will decrease relative to the freezing point of the pure water this property is used to melt the snow or ice on reads during the winter or to make homemade ice cream

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