Freezing point depression lab report discussion

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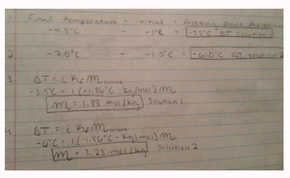

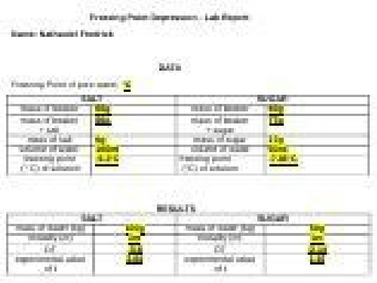

Why freezing point depression. How freezing point depression works. Freezing point depression lab report answers. How do you calculate freezing point depression.

Freezing Point Depression Purpose: The purpose of this experiment is to determine the freezing point depression of ice by making ice cream. Safety Precaution: Allergy precaution! Do not touch or eat if allergic to dairy or lactose intolerant. Materials: • ½ cup of milk • ½ cup of whipping cream/ heavy cream • ¼ cup sugar • ¼ teaspoon vanilla or vanilla flavoring • ½ to ¾ cup of sodium chloride • 2 cups of ice • 1- quart Ziploc bag • 1- gallon Ziploc bag • Measuring cups • Spoons • Cups Procedure: 1. Add the milk, whipping cream/ heavy cream, sugar and vanilla/ flavoring to the quart sized Ziploc bag. Seal the bag completely. 2. Put 2 cups of ice into the gallon Ziploc bag. 3. Add the salt to the bag of ice. 4. Place the closed quart…show more content…Continue to rock the bag for 10-15 minutes or until the contents of the quart bag have solidified into ice cream. 7. Open the gallon bag. 8. Remove the quart bag, open it and place the ice cream into cups with spoons and eat it. Explanation of the Science Behind this Experiment: This experiment is an example of freezing point depression. Ice melts when it absorbs energy so it can change from a solid to a liquid. On the contrary, when salt is added to the ice, it lowers the freezing point of the ice. That means that in order for the ice to melt, it needs to absorb even more energy. Once salt is added to the ice, it makes the ice colder, allowing it to freeze. Additionally, large crystals of salt are used because it takes more time for larger pieces of salt to dissolve in the water, which allows the ice cream to cool even more. In this experiment, the way to see and determine the freezing point depression is by measuring the temperature of the ice in the gallon bag before salt is added and to measure the temperature of the ice and salt once the ice cream is formed in the quart bag. By having these two measurements of temperature before and after the salt was added, shows the freezing point depression and how it works once salt is added to the Freezing Point Depression Purpose: The purpose of this lab is to demonstrate freezing point depression by dissolving salt into two liquids and monitoring temperature. Materials: test tube, Thermometer, 10 mL graduated cylinder, 2 micropipettes, Styrofoam cups, 4 pieces plastic wrap, 70% ethyl rubbing alcohol, 91% isopropyl rubbing alcohol, ice, distilled water, rock salt Procedure: Using the graduated cylinder, measure 2 mL of alcohol and pour it into the test tube. Add 10 mL of… Download Skip this Video Download Presentation FREEZING POINT DEPRESSION LAB 1 / 3 Introduction: Freezing point depression occurs when the freezing point of a liquid is lowered by adding another compound on it. The freezing point of water is 0º, but it can be depressed by adding a solvent such as salt in our experiment. It's a colligative property of matter. In our experiment we're going to add some sugar to 5 different test tubes (0,5/1/1,5/2/2,5 grams per test tube) and we will put them up in a salt ice mixtured beaker. The equation that we will use later on to calculate the change in freezing point is: Change in boiling point = Kc x molality (AT: change in boiling point) (Kc: Cryoscopic constant, Kc for water is 1,86 and for Acetic acid is 3.9) (molality: Mol/kg) The more solute added in H2O, lower freezing point it will have. So, what happens when we place the test tubes in a salt ice mixture beaker? Adding salt to the beaker with ice causes a temperature drop that slows the melting rate and increases the freezing one. The final result is that the ice melts slowly after the addition of salt. Another point to take into consideration is that as more solute, more molality, and as more molality, the freezing point gets lowered. Objective: To investigate the relationship between the molality and the freezing point of a solution. Hypothesis: In this experiment we will see how the change in freezing point of a solution lowers when more solute is added to water. When the molality of the solution is bigger, the freezing point decreases. We're going to place all the test tubes when different measurements of sugar in a big beaker with some ice cubes and salt. As I said before, the freezing point of water freezes at 0ºC, however, it's going to be lowered when salt is added. This is because the freezing point of solutions is all lower than that of the pure solvent. The salt dissolves into the liquid water in the ice and lowers its freezing point. This is because adding the solute will disrupt the equilibrium, the salt molecules dissolve in the water, but do not pack easily into the molecules in the solid (ice), making the freezing point of water being lowered when salt is added. When we add more sugar, (more molality) the FP of the solution will be lowered. The molality indicates that the higher it is, the greater the freezing point is depressed, so to conclude, in this experiment the change in freezing point depression will be proportional to the molality, the higher it is, the lower FP. Table of results and graph: Molalities of each sugar solution: The first thing we need to do is calculate the moles by this formula: moles = g of sugar/ molecular mass of sucrose (MM of sucrose: 342.30). After we calculate the moles, using the formula of molality (m): molality = moles/ kg of solvent (water – 0.005kg). We need to follow this process to get the molality of every sugar test tube. 0 g sugar in 5.0 g water – Pure water so à 0 mol/kg 0.5 g sugar in 5.0 g water – (0.5/342.30) /0.005= 0.001/0.005= 0.2 mol/ kg 1.0 g sugar in 5.0 g water – (1.0/ 342-30) /0.005= 0.003/ 0.005= 0.6 mol/ kg 1.5 g sugar in 5.0 g water – (1.5/342.30) /0.005= 0.004/ 0.005= 0.8 mol/ kg 2.0 g sugar in 5.0 g water – (2.0/342.30) /0.005= 0.006/ 0.005= 1.2 mol/ kg 2.5 g sugar in 5.0 g water – (2.5/342.30) /0.005= 0.007/0.005= 1.4 mol/ kg Table: Mass of sugar in solution (g) Molality (mol/kg) Attempt 1 - Freezing point (oC) Attempt 2 - Freezing point (oC) Average freezing point (oC) Change in freezing point compared to pure water (oC) 0 0 - 0 - 0.6 0.3 -0.3 0.5 0.2 - 0.6 - 0.8 0.7 -0.37 1.0 0.6 - 0.3 - 0.1 0.2 -1.12 1.5 0.8 - 1.7 - 1.7 1.7 -1.49 2.0 1.2 - 2.0 - 2.2 2.1 -2. 23 2.5 1.4 - 2.9 - 2.5 2.7 -2.60 Graph: Conclusion (explaining the results and how they match to our hypothesis): While completing the table and creating the graph we've noticed that as the molality increases, the freezing point depression decreases (ºC). When for example the molality is 0,2, the FP is of -0,37 and when the molality is 1,4, the FP is -2,60. This clearly shows what we've said, and this is because the freezing point depression is directly proportional to the molality of the solute. While more mass of sugar is added, more molality there's in the solution. When more molality, the change in freezing point is going to be lowered. A point to take into consideration is the position of the table. The freezing point depression is negative, that's why the molality, which is positive is in the upper part of the graph, and all the dots go down in the graph when the molality is bigger and the freezing point depression is lowered According to the hypothesis and the background information , the results obtained match with what we said before in the hypothesis Evaluation (Discussing problems and suggesting improvements): Generally, we think we worked well as a group and we haven't committed big or notable errors that are lately seen in the results. However, as in every lab experiment we had some strong and weak points; On one hand, there were few strong points such as when calculating the temperature, we were aware that it remained constant and didn't change and when we were sure about this, we took out the thermometer form the cold or ice. Also, we were very precise at the time of getting the correct measurements. We followed the measurements that were in the method exactly as they were. We get the amount of water needed and all the elements we needed to use. We were extremely careful in this part because in other experiments, not taking perfectly and carefully the right measurements caused a complete disaster and non-sense results. On the other hand, during the experiment we had some weak points. Having weak points in an experiment is normal because in the lab the're involved lots of factors that makes it easier to get a mistake. For, the next lab session we should learn about these small mistakes and correct them: Firstly, we had some problems, as we didn´t know when we had to take out the thermometer. We didn’t know when it had reached the freezing point, so we had to repeat it a few times. Then, the way of calculating the temperature with those thermometers and continuously taking out from the solution and putting again in, is not a very precise and accurate way of completing and getting the freezing point of a solution. That way, the results must vary from other groups experiments and might not be as accurate as we wanted them to be. We could improve this weaks points for the next lab session by finding a new method or way of calculating temperature. Maybe putting the solution at a fridge or something that maintains constant the temperature we need to reach, this is another easy and better way. References: Chemwiki.ucdavis.edu, (2015). Freezing Point Depression - Chemwiki. [online] Available at: [Accessed 19 Feb. 2015]. All-science-fair-projects.com,. (2015). Science Fair Projects - The effect of salt and sugar on the freezing point of water. Retrieved 19 February 2015, from