Review Lab #5

Making Sodium Chloride

Name:

One of the most common compounds on Earth is sodium chloride. In this lab we will make NaCl in a reaction between baking soda (sodium hydrogen carbonate) and hydrochloric acid. Two additional products form, carbon dioxide and dihydrogen monoxide.

The acid we will use is fairly strong, be especially careful to not get it on your skin. Goggles are mandatory, of course.



Procedure: Mass an evaporating dish empty WITH A LID, then add exactly 1.95 grams of baking soda to this dish. Slowly pour 15 mL of the acid into the powder, then add a few drops more, until you are sure the reaction ends.

Put a watch glass onto the top of the evaporating dish before you begin to slowly heat the products or else salty water splashes out—which is your percent error getting bigger! Heat until you are convinced that the water is completely evaporated away.

Allow the dish to cool, for at least five minutes, before you put it onto the scale again.

Wash equipment with soap and water, put upside down to dry, wash your hands as well.

Data table	Mass in grams
Empty evaporating dish AND LID	
Dish plus the baking soda AND LID	
Baking soda only	
Mass of dish, lid, and solid product	
Mass of solid product only	

Experiment Questions

- 1. Write a balanced chemical equation with phases for the rection that you did in lab.
- 2. If you started with 1.95 grams of baking soda, how many grams of salt should form?
- 3. What is your percent error for how much salt formed in your lab experiment today?
- 4. Explain how you got the salt & water separated using a famous "one-liner" from chemistry class.

Review Questions

5. Here's a new thing: Percent Yield is the measure of how much sodium chloride formed compared to how much was supposed to form. It's like percent error, but a bit reversed. To calculate percent the formula is...

Calculate your PERCENT YIELD.

% Yield = $\frac{\text{Measured mass NaCl}}{\text{Expected mass NaCl}} X 100\%$

- 6. The density of NaCl is 2.17 g/cm³. If you had exactly one pound of this (454.00 grams) what would be the volume of this amount of salt?
- 7. The melting point for NaCl is 801°C. Convert that into Kelvin with a formula.
- 8. If you have a 1.00 liter saturated solution of $NaCl_{(AQ)}$ at STP, how many grams of sodium chloride are dissolved in this solution?
- 9. If you have a 455.25 mL saturated solution of NaCl_(AQ) at standard pressure and 90°C, how many grams of NaCl are dissolved in this solution?
- 10. Draw the Lewis Dot Diagram for sodium chloride.
- 11. How many formula units of sodium chloride are present in one pound of salt (454.00 g)?
- 12. Explain in one sentence why $NaCl_{(AQ)}$ conducts electricity but table sugar, $C_{11}H_{22}O_{11(AQ)}$ doesn't.
- 13. Skip this one
- 14. If you have 325 mL of pure water at room temperature of 24.3C, and you put into this sufficient sodium chloride to saturate it (also at room temperature), would this solution's immediate temperature remain steady, or get a little colder, or a little hotter. You must have a reason for your choice, guesses are just wrong. (hint, look at Table I)
- 15. Compare the percent composition by mass of chlorine in NaCl to KCl and CaCl₂. Show the math.
- 16. When comparing three 1.0 M NaCl_(AQ), 1.0 M KCl_(AQ), and 1.0 M CaCl_{2(AQ)}, which has the highest boiling point? Which has the lowest freezing point? Show numbers to "prove" your answer.

This lab report requires... a cover page with an intro sentence, the data table, and the 15 questions above.

Math must be shown, please use plenty of space. No conclusion is required. 25 points maximum.