

Name: _____

Date: _____

Determining the Formula of a Hydrate

Objective: To use two different methods to determine the formula of a hydrate.

Materials: Name of hydrate used: _____

Equipment:

Bunsen burner, striker or matches, test tube, ring stand, test tube clamp, 50 mL beaker, spatula, evaporating dish, tongs

Procedure:

Part 1:

1. Record the mass of an empty evaporating dish.
2. Add two heaping spatulas of the hydrate to the dish and record the mass.
3. Attach a ring clamp to the ring stand. If necessary, place a wire gauze on top of the ring. Otherwise, the dish may rest in the clamp on its own.
4. Make sure the Bunsen burner is positioned so that the hydrate receives plenty of heat.
5. In a hot flame, heat the hydrate with the Bunsen burner.
6. What do you notice happening? Record your observations in the table.
7. In a cold flame, warm the rest of the dish. Record your observations in the appropriate space.
8. Use the spatula to carefully inspect the hydrate as it is heated. Make sure it does not burn (brown) but it is thoroughly heated. When you are sure of these things, turn off the gas to the Bunsen burner.
9. Use tongs to remove the dish from its position on the clamp. Allow the dish to cool on the table. After a few minutes it can be placed on the balance.
11. Observe what happened to the hydrate. Note any changes in the observation table.
12. Empty the solid hydrate into the trash. Clean the dish with soap and water.

Part 2:

1. Attach a test tube to a clamp and mass on a balance. Make sure no edges of the clamp are touching anything outside the balance.
2. Remove the test tube from the clamp and add two heaping spatulas of the hydrate.
3. Reattach to the clamp and record the mass of these two items in the data table.
4. Reattach the clamp to the ring stand making sure it is on an angle, but not one which allows the hydrate to fall out.
5. Place the beaker on the table underneath the mouth of the test tube.
6. In a hot flame, heat the hydrate with the Bunsen burner.
7. What do you notice happening? Record your observations in the table.
8. In a cold flame, warm the rest of the test tube. Are you able to collect any water in the beaker? Record your observations in the appropriate space.
9. After you have collected the water in the beaker, turn off the gas to the Bunsen burner.
10. Remove the clamp from the ring stand. Under the hood, allow the test tube to cool.
11. After a few minutes the test tube will be cool and it can be placed on the balance.
12. Observe what happened to the hydrate. Note any changes in the observation table.
13. Empty the hydrate from the test tube into the evaporating dish. Add a few drops of water. What happened? Note this in the lab book.
14. Empty the solid hydrate into the trash. Clean the test tube with the test tube brush, soap, and water.
15. Reattach the test tube to the clamp and attach the clamp to the ring stand.

Repeat either parts one and two until no time is left.

Enter your data into the computer at some time before next class.

Data Table:

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6
Method	Evaporating dish	Test tube				
Mass of empty evaporating dish/test tube						
Mass of evaporating dish/test tube + hydrate (before heating)						
Mass of evaporating dish/test tube + salt (after heating)						
Observations:						

Calculations:

Formula:

- a. Calculate the mass of water in the hydrate.
- b. Calculate the mass of salt remaining for each trial.
- c. Find the ratio of water to salt for each trial.
- d. Perform a Q-Test.
- e. After examining the data, calculate the average of the data pieces that remain and write a general formula for the hydrate.

Conclusion:

1. Explain what happened (chemically) when water was sprinkled on the hydrate after it was heated.
2. What are the possible sources of error in this lab? Consider both procedures. It is important to note that a factor affecting one procedure may not impact the other.