**Percent Composition & Hydrates Lab**

**Objective**: You will study both hydrates and percent composition through proper lab techniques. Using data gathered during the lab, you will calculate the percent of water in a hydrate.

**Procedure** (**Finding the percentage of water in copper (II) sulfate that is hydrated).**

1. Determine and record the mass of an empty **evaporating dish** using the **balance**.
2. Get about 2 - 5g of copper (II) sulfate from Miss Benzoni. You will subtract to find the exact mass.
3. Place the sample in the evaporating dish. Determine and record the mass of the evaporating dish and sample.
4. Place the evaporating dish on a **hot plate.**
5. Heat the evaporating dish w/ the sample using a **hot plate**.
6. Continue heating until the sample turns entirely white.
7. Using tongs remove the dish from the hot plate.
8. Turn off the hot plate and allow the sample to cool for 3 - 5 minutes.
9. Determine and record the mass of the anhydrous sample and dish.
10. Add a few drops of water to the cooled sample and note observations.
11. Clean up by disposing of the sample in the trash – rinse out the dish and wipe it dry.

**Data Table**: Mass of evaporating dish \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mass of evaporating dish and copper (II) sulfate \_\_\_\_\_\_\_\_\_\_\_\_\_\_

\**Mass of copper (II) sulfate used (before heating) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

Mass of evaporating dish and copper (II) sulfate (after heating) \_\_\_\_\_\_\_\_\_\_\_\_\_\_

\**Mass of anhydrous copper (II) sulfate (after heating)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*\* These masses are not measured during lab they will be calculated after completing the lab.*

## Calculations

1. Calculate the mass of copper (II) sulfate used in the lab (before heating). Write this mass on your data table.

2. Calculate the mass of anhydrous copper (II) sulfate after heating. Write this mass on your data table.

3. Subtract the mass of the copper (II) sulfate hydrate after heating from the mass of the hydrate before heating to find the mass of water in your hydrate sample.

4. Calculate the % of water in the Copper (II) sulfate when hydrated. Hint: this will involve the mass of water you found above and the mass of the hydrate before it was heated.

5. Calculate the % of copper (II) sulfate (before heating the sample).

6. Using the answers from 4 and 5, determine the formula for the copper (II) sulfate hydrate – ie how many waters will the formula contain.

Fill in the # of water molecules in the final formula here: CuSO4 ● \_\_\_\_\_ H2O

Write the name of your final compound here: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Questions**

1. Was the copper (II) sulfate change, physical or chemical? Why?
2. Why did we add water to the white copper (II) sulfate at the end of the experiment?

**Error Analysis: List two possible errors and their effect on the lab.**

**#1**

**# 2**

**Analysis Questions**

In this lab we studied percent composition as related to a hydrate. The definition of a hydrate is

The hydrate went from a blue color to white and then back to blue because