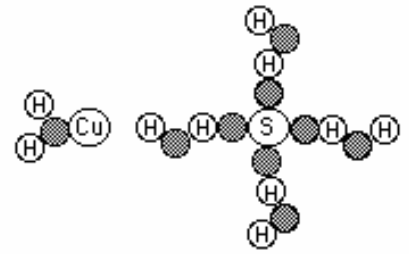
South Pasadena • AP Chemistry

Name _____
Period ___ Date ___/___/___

3 • Molecules and Compounds

HYDRATE DEMONSTRATION EXPERIMENT

Cupric sulfate, $CuSO_4$ is a **hydrate**, that is, there are water molecules incorporated into the solid. Circle the water molecules on the right. How many do you see? ____



Cupric sulfate has the formula, $CuSO_4 \cdot 5H_2O$.
It is named **cupric sulfate pentahydrate**.

Calculate the **mass** of $CuSO_4 \cdot 5H_2O$ _____ Notice that the "·" means "attached" not "multiply by".

What is the **percent water** in the hydrate? _____ Justify your answer below with a calculation.

This percent can be determined **experimentally** by heating the hydrate. The water molecules will leave as steam. What is the appearance of cupric sulfate pentahydrate? _____

We will heat the cupric sulfate in a **crucible** (a porcelain cup that can be heated red-hot without breaking). Draw the heating set-up used in this demonstration.

DATA

mass of clean, dry crucible: _____ ± 0.01 g
mass of crucible + solid: _____ ± 0.01 g
mass of crucible & solid after heating 1: _____ ± 0.01 g
mass of crucible & solid after heating 2: _____ ± 0.01 g
mass of crucible & solid after heating 3: _____ ± 0.01 g

CALCULATIONS

What is the mass of the original solid? _____
What mass of water vaporized? _____
What was the **experimental** % of water in the hydrate? _____
What is the **percent error** in the **experimental** percentage of water compared to the **calculated** percentage of water? _____

QUESTIONS

What is the appearance of the **anhydrous** cupric sulfate? _____
Why was the crucible heated again and again?

Why was the crucible allowed to cool before being massed?

When you know about **moles**, calculate the following:

	mass	molar mass	moles	ratio of moles
cupric sulfate pentahydrate				
water				
anhydrous cupric sulfate				**1**