Reacting Copper With Sulfur

Name_____Date_____Period___Group___

Background: When copper and sulfur are mixed together and then heated, you will observe a change in its color and odor, in addition, a gas will be produced. What you are observing is a chemical change. You will produce a new substance, and you cannot separate the new substance to get back the original mixture. If you have ever smelled rotten eggs, then you'll have some idea of how unpleasant sulfur can be in some situations. Since we'll be heating sulfur, along with copper, the resulting odors can be very offensive and with some individuals, irritating. To keep these odors from causing any problems, we're going to confine them in the test tube they're being heated in. To do this, you'll cover the end of the test tube with a small balloon, after you've added the copper and sulfur to the tube.

Problem: When copper and sulfur are mixed together and heated, will the mass of the new mixture increase, decrease or remain the same?

Hypothesis:_____

_____

Variables: By the time you finish this experiment ,you will need to identify the different types of variables present in this investigation. Consult your notes for definitions of the types of variables.

Independent Variables:_____

_____

Dependent Variables:_____

_____

Controlled Variables:_____

_____

Materials: Small test tube, balance, scoop, funnel, small containers of copper and sulfur, alcohol burner, test tube holder, small balloon, centimeter ruler

Procedures:

1. Adjust your balance to read "zero" when nothing is on the measuring pan.
2. Use the scoop to add copper granules to the test tube equal to a depth of 1 cm.
3. Use the scoop to add sulfur to the test tube equal to a depth of 1 cm (total depth 2 cm).
4. Cover the test tube with your finger and shake it until the copper and sulfur are evenly mixed.
5. Now seal the end of the test tube with the small balloon. The balloon will remain on until you are done massing.
6. Use the test tube holder to grip the test tube right under the lip of the test tube opening.
7. Measure the mass of the test tube and its contents, test tube holder and balloon, then record the mass in data table 2 (see back). Leave the sliders of the balance in place (don't re-zero the balance).
8. Light your alcohol burner and hold the test tube with the tube holder at a 45º angle over the burner flame and heat until no more yellowish gas is seen swirling inside of the tube. Keep the balloon itself away from the flame. Blow out the flame of the burner when done heating and place the cap back on the burner. Place the test tube on the base of the balance under the beams and allow it to cool.
9. Now observe and record the color and odor of unheated copper and sulfur. Record your results in data table 1 on back of lab.
10. Only when the test tube has cooled, mass the test tube and its contents, the test tube holder and balloon and record the mass in the data table 2.
11. Calculate the change in mass and record in data table 2.
12. Calculate the percent change in mass as indicated in data table 2.
13. Observe and record the color and odor. (Remove balloon only after massing and let it air out before testing, with proper technique, for odor!) Record your observations in data table 1.

Safety: Safety goggles must be worn when using burner, as well as tying back long hair and wearing proper footwear. Handle test tube only when cool.

Data Table 1

	Copper (unheated)	Sulfur (unheated)	Copper + Sulfur (After heating)
Odor			
Color			

Data Table 2

1. Mass of test tube and contents before heating	**g**
2. Mass of test tube and contents after heating	**g**
Change in mass (#2 – #1)	**g**
Percent change in mass [(#2– #1) ÷ #1] x 100 Round your answer to 1 decimal place	**%**

1. Any change in mass of more than ± 0.2 grams represents a real change in mass. Based on this information, was the mass of copper and sulfur affected by heating? Explain your reasoning.

Overall Conclusion : 1-State if your original hypothesis was correct or incorrect. This should be based on the best information collected from the experiment. 2-If it was incorrect, give the correct answer, again based on the best information collected from the experiment. 3-Include a brief numerical summary and comparison of the data collected during the experiment telling how it supports your answer for the hypothesis.

Sources of Error Identify two things that people may have done incorrectly that would have caused them to get totally different answers from the rest of the class. These errors must be unique,in other words they have not been applicable in previous labs. They must be new sources of error. Be specific about what might have been done.