Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Honors Chemistry: Reactions of Copper Report Sheet*** Hr \_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Data Table***

|  |  |
| --- | --- |
| **Initial mass plastic dish (g)** |  |
| **Initial mass copper (g)** |  |
| **Final mass copper/dish (g)** |  |
| **Final mass copper (g)** |  |

*\*Report all masses to 0.001 g of precision*

***Pre-lab Questions***

1. Define percent yield in general terms.
2. What is meant by the term decantation?
3. What is the difference between an endothermic and exothermic reaction? What observations allow you to tell the difference between the two?
4. After the experiment is complete, many students will have above 100% yield. How is this possible and what is the likely cause?

***Lab Questions***

1. **Reaction A**

Observations:

*In reaction A, you reacted copper metal with nitric acid to produce aqueous copper (II) nitrate, nitrogen dioxide gas, and liquid water.* ***Write and balance this equation, showing the correct phases of each chemical.***

2. **Reaction B**

Observations:

*In reaction B, you are reacting the copper (II) nitrate produced in reaction A with aqueous sodium hydroxide in a double replacement (DR) reaction.* ***Predict the products of this DR reaction and balance the equation, showing the correct phases of each chemical.***

3. **Reaction C**

Observations:

*In reaction C, you are decomposing the copper (II) hydroxide produced in Reaction B by heating it on the hot plate. Hint: This reaction could also be considered a dehydration reaction.* ***Predict the products of this reaction and balance the equation.***

1. In step 6 of the procedure from Day 1, you washed the solid with distilled water and decanted it off several times. What purpose did that serve? Specifically, what chemical byproduct was washed away?
2. **Reaction D**

Observations:

*In reaction D, you are reacting the copper (II) oxide produced in reaction C with sulfuric acid in a double replacement (DR) reaction.* ***On your report sheet, predict the products of this DR reaction and balance the equation, showing the correct phases of each chemical.***

1. **Reaction E**

Observations:

*In reaction E, you are reacting the copper (II) sulfate produced in reaction D with aluminum in a single replacement (SR) reaction.* ***On your report sheet, predict the products of this SR reaction and balance the equation.***

1. **Final Product** (after several days of drying)

Observations:

***Post-Lab Questions***

1. Determine the percent yield of copper isolated in the experiment.

2. Hypothetically, if your % yield was greater than 100% what are two specific sources of error?

3. You did the experiment and calculated 98.6% yield. Does this necessarily mean that you ended with 98.6 % of your original copper? Explain your answer.