

Chemistry 20

Simple Stoichiometry Lab

Name _____ Lab Partner _____ Score _____

Purpose: To predict and collect a precipitate formed in a double replacement reaction.

Problem: What is the effect upon the mass of precipitate formed if the amount of copper (II) sulfate is changed?

Equipment: electronic scale
Weighing paper
100 mL graduated cylinder
Meniscus finder
Copper II sulfate pentahydrate
Sodium hydroxide (a deliquescent ionic compound)
Distilled water
Beakers (various sizes)
Stir rod
Wash bottle
Funnel and filter paper
Ring clamp and stand

Prelab

1. Write a balanced reaction for a double replacement reaction between solid copper (II) sulfate pentahydrate and a solution of sodium hydroxide.

2. Your assigned mass of copper (II) sulfate that will be used in this lab is ____ g
 - a. Using this value and assuming excess sodium hydroxide, calculate the mass of precipitate that should be formed. (Theoretical value). You will have to share this value with other lab groups So be certain it is correct!
3. Identify the manipulated, responding and control variable(s) for this lab

Manipulated _____ Responding _____

Control _____

Procedure:

1. Clean and dry all glassware.
2. Weigh YOUR assigned amount of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}(\text{s})$ and place it in a clean beaker
3. Record the exact amount of mass that you have used.
4. Measure out 100 mL of the 1.50 mol/L $\text{NaOH}(\text{aq})$ that is provided

5. Add this solution to the copper (II) sulfate and stir.
6. Record your observations.
7. Decant off the liquid part of the mixture in your beaker. Do NOT lose any solid chunks while doing this. It is safe to put the decanted liquid down the sink.
8. Get and weigh a large piece of filter paper. Record the mass.
9. Set up the funnel and filter paper using the ring stand.
10. Be sure the filter paper is rinsed with distilled water and has a good seal with the side of the filter.
11. Carefully transfer all the solid left in your beaker to the filter paper. Try to spread the solid out so that it will dry faster. (this is why a BIG piece of filter paper is good)
12. Using a minimum of water to rinse, ensure that ALL the solid precipitate from the beaker is transferred to the filter paper.
13. Allow the funnel and filter paper to dry at least overnight
14. Weigh the filter paper and the precipitate. Record the mass

Observations:

You must record your own observations and observations from four other groups who will have started with a different mass of copper (II) sulfate pentahydrate.

My observations

Mass of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}(\text{s})$	Mass of filter paper	Mass of precipitate and filter paper
Theoretical yield of precipitate	Actual yield of precipitate	% yield for your value

Summary of observations from 5 groups

Mass of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}(\text{s})$	Theoretical yield of precipitate	Actual Lab yield for precipitate	Percentage yield

Analysis:

Is there a general pattern for the percentage yield? If or if not, give scientific reasons why this has happened. Remember that an error in measurement is not a scientific reason!!!! Never give this as an excuse for being off from the expected value!

Conclusion:

Remember that a conclusion must answer the problem. It must be based on your observations and must be supported with accepted scientific theories and knowledge. DO NOT restate your observations. Conclusions must give a "WHY DID YOU SEE THIS?"