

Limiting Reagent and Percent Yield Lab

Required sections:

Header
Title
Prelab
Procedure (cut and paste)
Data table (cut and paste)
Calculations
Conclusion

Materials:

Beaker
Erlenmeyer flask
Filter paper
Funnel
Drying oven
Graduated cylinder

Prelab question: *Get my signature!*

1. Write the balanced equation for the reaction between calcium chloride and sodium carbonate.

Clean up:

You *must* clean up after your experiment. Failure to wash your glassware and funnel (using soap and test tube brush) will result in the loss of points for your entire lab group.

Disposal:

The filter paper and solid can be thrown away in the trash.

Calculations: *(If you do not show your work, you will not get credit!) Get my signature!*

1. Use the mass of sodium carbonate (from your data table) to calculate the mass of chalk (calcium carbonate) that should be produced. (Hint: mass-mass stoichiometry problem)
2. Use the mass of calcium chloride to calculate the mass of chalk that should be produced. (Another stoich problem)
3. What is the theoretical yield of chalk?
4. What is the limiting reagent in this lab? Excess reagent?
5. Calculate your percent yield for this experiment.

Procedure:*Day one...*

1. Determine the mass of a beaker, a clean, dry piece of filter paper, and a flask.
2. Write your names on the filter paper in **pencil**. Pen will smear.
3. Add *approximately* 1 g sodium carbonate to the beaker and record the **actual** mass in your data table. Your actual mass will probably not be exactly 1.0 g. **Record** your observations.
4. Add *approximately* 1 g calcium chloride to the flask and record the **actual** mass. **Record** your observations.
5. Add about 25 mL of distilled water (this does NOT need to be exact) to the beaker and another 25 mL of distilled water to the flask and gently swirl until the solid is dissolved. **Record** your observations.
6. Pour the solution from the flask into the beaker and gently swirl. **Record** your observations.
7. Filter the mixture (using a funnel, flask, and filter paper) from the beaker and allow the filtrate to drip into the flask.
8. Gently rinse the beaker with a small amount of distilled water to remove any solids in the beaker. Add this to the filter paper.
9. When the dripping has nearly stopped, rinse the solid with 10 mL distilled water.
10. When no more liquid drips out, remove the filter paper containing the solid from the funnel. Place the filter paper (with solid) into the beaker and set aside so it can be placed in the drying oven. This will be dried overnight.

The next day...

11. After the beaker, filter paper, and chalk have dried, remove from the oven **carefully** and allow to cool. **Record** your observations.
12. Determine the mass of the beaker, the dry filter paper, and the solid.
13. The filtrate can be disposed of down the sink. The filter paper and precipitate can be thrown away in the trash.
14. Wash your glassware thoroughly with soap and a brush. The glassware may look clean when wet but not when dry. Make sure everything is well scrubbed! Failure to clean your glassware will result in a loss of points.

Data:

<u>Item</u>	<u>Mass (g)</u>
Beaker	
Flask	
Filter paper	
Sodium carbonate	
Calcium chloride	
Beaker + filter paper + dry chalk	
Chalk alone	

Don't forget to add your qualitative observations as well!