Name:_____Date:_____Block:_____

Limiting Reactant Lab

Pre-lab:

In this lab, two aqueous solutions will be prepared: lead (II) nitrate and potassium iodide. The two aqueous solutions will be mixed together and a precipitate will be made through a double replacement reaction.

Below is the balanced equation that represents the reaction. Of the two products, which is the precipitate? Identify each product as solid, liquid, gas, or aqueous by placing the correct symbol in parentheses after each formula.

$$Pb(NO_3)_2(aq) \ + \ 2 \ KI(aq) \ \rightarrow \ 2 \ KNO_3(\quad) \ + \ PbI_2(\quad)$$
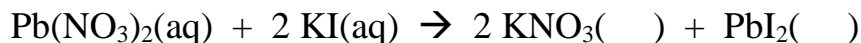
Purpose:

To produce a precipitate and separate the precipitate from the aqueous solution using filtration. To calculate the experimental yield of precipitate, theoretical yield and percent yield.

Safety:

Goggles must be worn at all times. Report spills and/or accidents immediately.

Procedure:

1. Measure about 1 gram of $Pb(NO_3)_2(s)$ into a 100 mL beaker. Record the exact mass.
2. Measure about 1.5 grams of $KI(s)$ into a 250 mL beaker. Record the exact mass.
3. Add enough distilled water to each beaker to completely dissolve the solid.
4. Stir each solution.
5. Pour contents of small beaker into the large beaker.
6. Stir the contents of the beaker.
7. Write names in pencil on the bottom of the filter paper.
8. Measure and record mass of the filter paper.
9. Fold the filter paper in half twice. Place the tip of the folded filter paper into a funnel. Once in the funnel, unfold the filter paper.
10. Place the funnel on top of an Erlenmeyer flask.
11. Pour precipitate and aqueous solution mixture on top of the filter paper.
12. Use a wash bottle of distilled water to get as much of the precipitate out of the beaker and onto the filter paper.
13. Once all the water has traveled past the filter paper, place the filter paper containing the precipitate on the blue tray. The precipitate will dry overnight.
14. Clean all glassware with tap water and return them to your station.
15. Wipe your lab bench with sponge and water.
16. Call Ms. Wong for final lab bench inspection.
17. Wash your hands with soap and water.

Data: Organize all measurements into a data table. Be sure to include units.

Calculations:

1. Calculate the theoretical yield (maximum amount) of precipitate in grams. Use a BCA chart.

2. Calculate the experimental yield of precipitate in grams. (this can only be done once you have the final, dry mass of precipitate)

3. Calculate the percent yield of precipitate. (this can only be done once you have the experimental yield)

Post-lab Discussion:

1. Identify the limiting reactant. Justify your answer.

2. Discuss possible sources of error that could have caused the percent yield to be less than 100%.

3. Spectator ions are those ions that do not undergo any chemical change during the reaction. Identify the two spectator ions of this reaction. Explain your reasoning.