



High School Science Virtual Learning

Chemistry

Limiting & Excess Reactant Practice

April 28, 2020



High School Chemistry

Lesson: [4/28/20]

Objective/Learning Target:

Students will be able to determine the limiting reactant in a reaction and calculate the theoretical and percent yield for a problem with multiple reactants.



Let's Get Started:

2.50 mol of copper II and 5.50 mol of silver nitrate are available to react by single replacement.

1. Write a complete and balanced equation for the reaction.
2. Identify the limiting reactant by determining the mass of copper (II) nitrate formed.

Let's Get Started: Answer Key



2. $2.50 \text{ mol Cu} \times \frac{1 \text{ mol Cu}(\text{NO}_3)_2}{1 \text{ mol Cu}} \times \frac{187.55 \text{ g Cu}(\text{NO}_3)_2}{1 \text{ mol Cu}(\text{NO}_3)_2} = 469 \text{ g Cu}(\text{NO}_3)_2$

$5.50 \text{ mol AgNO}_3 \times \frac{1 \text{ mol Cu}(\text{NO}_3)_2}{2 \text{ mol AgNO}_3} \times \frac{187.55 \text{ g Cu}(\text{NO}_3)_2}{1 \text{ mol Cu}(\text{NO}_3)_2} = 516 \text{ g Cu}(\text{NO}_3)_2$

So Copper II is the limiting reactant.

Lesson Activity:

Directions:

1. Watch the following video to review all the way back from stoichiometry to limiting and excess reagents.

Links:

- Video: [Crash Course Stoichiometry](#)



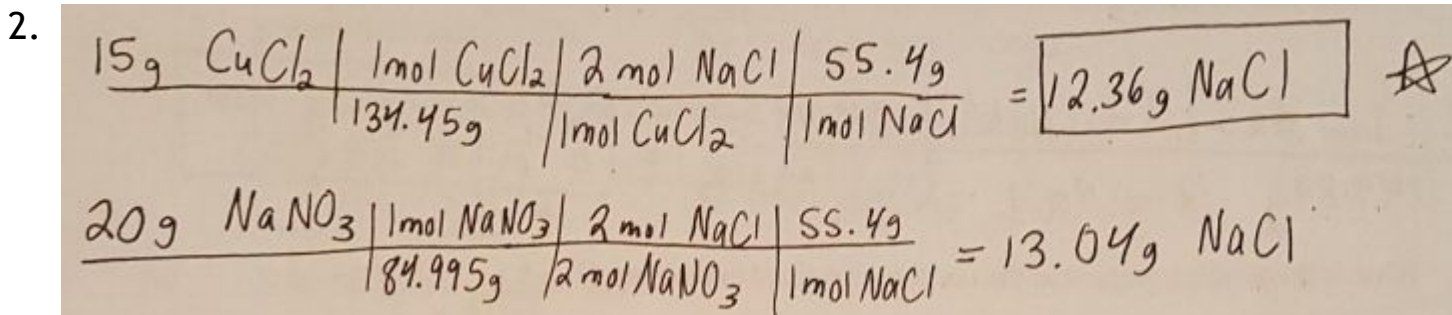
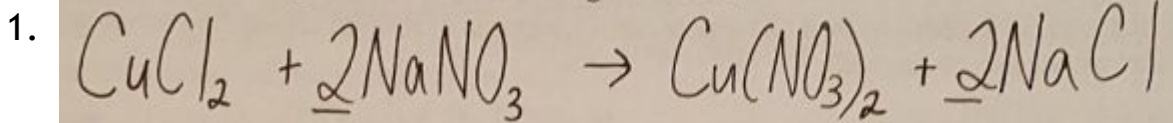
Practice

Complete the following questions using the information you learned during the lesson activity.

Questions:

1. When copper (II) chloride reacts with sodium nitrate, copper (II) nitrate and sodium chloride are formed. Write a balanced equation for the reaction given above:
2. If 15g of copper (II) chloride react with 20g of sodium nitrate, how much sodium chloride can be formed?
3. What is the limiting reagent for the reaction?
4. How many grams of copper (II) nitrate is formed?
5. How much of the excess reagent is left over in this reaction?

Once you have completed the practice questions check with the **answer** key.



3. **Copper (II) chloride**

Once you have completed the practice questions check with the **answer** key.

4.

$$\frac{15 \text{ g CuCl}_2}{134.45 \text{ g}} \times \frac{1 \text{ mol CuCl}_2}{1 \text{ mol CuCl}_2} \times \frac{1 \text{ mol Cu(NO}_3)_2}{1 \text{ mol Cu(NO}_3)_2} \times \frac{187.56 \text{ g}}{1 \text{ mol Cu(NO}_3)_2} = \boxed{20.93 \text{ g Cu(NO}_3)_2}$$

5.

$$\frac{15 \text{ g CuCl}_2}{134.45 \text{ g}} \times \frac{1 \text{ mol CuCl}_2}{1 \text{ mol CuCl}_2} \times \frac{2 \text{ mol NaNO}_3}{1 \text{ mol NaNO}_3} \times \frac{84.995 \text{ g}}{1 \text{ mol NaNO}_3} = 18.97 \text{ g NaNO}_3$$

needed to react with 15g CuCl₂

$$20 \text{ g} - 18.97 \text{ g} = \boxed{1.03 \text{ g leftover}}$$



More Practice:

Follow the links below to do more practice.

1. [Limiting and Excess Reagents](#)
2. [LR and ER](#)



Additional Practice:

Click on the link below for additional practice.

[Quizz Practice](#)