

Homework  
1-15-16

## Chemistry Worksheet: Limiting Reactant Worksheet #1

1. Consider the following reaction:  $2 \text{Al} + 6 \text{HBr} \rightarrow 2 \text{AlBr}_3 + 3 \text{H}_2$

a. When 3.22 moles of Al react with 4.96 moles of HBr, how many moles of  $\text{H}_2$  are formed?

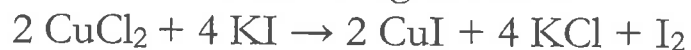
b. What is the limiting reactant? \_\_\_\_\_

2. Consider the following reaction:  $3 \text{Si} + 2 \text{N}_2 \rightarrow \text{Si}_3\text{N}_4$

a. When 21.44 moles of Si react with 17.62 moles of  $\text{N}_2$ , how many moles of  $\text{Si}_3\text{N}_4$  are formed?

b. What is the limiting reactant? \_\_\_\_\_

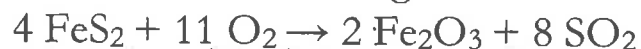
3. Consider the following reaction:



a. When 0.56 grams of  $\text{CuCl}_2$  reacts with 0.64 grams of  $\text{KI}$ , how many grams of  $\text{I}_2$  are formed?

b. What is the limiting reactant? \_\_\_\_\_

4. Consider the following reaction:



a) When 26.62 grams of  $\text{FeS}_2$  reacts with 5.44 grams of  $\text{O}_2$ , how many grams of  $\text{SO}_2$  are formed?

b) What is the limiting reactant? \_\_\_\_\_

Key

## Chemistry Worksheet: Limiting Reactant Worksheet #1

1. Consider the following reaction:  $2 \text{Al} + 6 \text{HBr} \rightarrow 2 \text{AlBr}_3 + 3 \text{H}_2$

a. When 3.22 moles of Al react with 4.96 moles of HBr, how many moles of  $\text{H}_2$  are formed?

(Al)

$$\frac{3.22 \text{ mol Al}}{2 \text{ Al}} \times \frac{3 \text{ H}_2}{1} = 4.83 \text{ mol H}_2$$

Al Excess

(HBr)

$$\frac{4.96 \text{ mol HBr}}{6 \text{ HBr}} \times \frac{3 \text{ H}_2}{1} = 2.48 \text{ mol H}_2$$

HBr Limiting

b. What is the limiting reactant? HBr

2. Consider the following reaction:  $3 \text{Si} + 2 \text{N}_2 \rightarrow \text{Si}_3\text{N}_4$

a. When 21.44 moles of Si react with 17.62 moles of  $\text{N}_2$ , how many moles of  $\text{Si}_3\text{N}_4$  are formed?

$$\frac{21.44 \text{ mol Si}}{3 \text{ Si}} \times \frac{1 \text{ Si}_3\text{N}_4}{1} = 7.15 \text{ mol Si}_3\text{N}_4$$

Si limiting

$$\frac{17.62 \text{ mol N}_2}{2 \text{ N}_2} \times \frac{1 \text{ Si}_3\text{N}_4}{1} = 8.81 \text{ mol Si}_3\text{N}_4$$

 $\text{N}_2$  Excess

b. What is the limiting reactant? Si

3. Consider the following reaction:  
 $2 \text{CuCl}_2 + 4 \text{KI} \rightarrow 2 \text{CuI} + 4 \text{KCl} + \text{I}_2$

a. When 0.56 grams of  $\text{CuCl}_2$  reacts with 0.64 grams of  $\text{KI}$ , how many grams of  $\text{I}_2$  are formed?

$\text{I}_2$  Excess

$$\frac{0.56 \text{ g CuCl}_2}{134 \text{ g}} \times \frac{1 \text{ mol CuCl}_2}{2 \text{ CuCl}_2} = 0.0042 \text{ mol CuCl}_2 \times \frac{1 \text{ I}_2}{2 \text{ CuCl}_2} = 0.0021 \text{ mol I}_2$$

$\text{KI}$  Limiting

$$\frac{0.64 \text{ g KI}}{166 \text{ g KI}} \times \frac{1 \text{ mol KI}}{4 \text{ KI}} = 0.0039 \text{ mol KI} \times \frac{1 \text{ I}_2}{4 \text{ KI}} = 0.00096 \text{ mol I}_2 \times \frac{254 \text{ g}}{1 \text{ mol}} = 0.24 \text{ g I}_2$$

b. What is the limiting reactant?  $\text{KI}$

4. Consider the following reaction:  
 $4 \text{FeS}_2 + 11 \text{O}_2 \rightarrow 2 \text{Fe}_2\text{O}_3 + 8 \text{SO}_2$

a) When 26.62 grams of  $\text{FeS}_2$  reacts with 5.44 grams of  $\text{O}_2$ , how many grams of  $\text{SO}_2$  are formed?

$\text{FeS}_2$  Excess

$$\frac{26.62 \text{ g FeS}_2}{120 \text{ g}} \times \frac{1 \text{ mol FeS}_2}{4 \text{ FeS}_2} = 0.22 \text{ mol FeS}_2 \times \frac{8 \text{ SO}_2}{4 \text{ FeS}_2} = 0.44 \text{ mol SO}_2$$

$\text{O}_2$  Limiting

$$\frac{5.44 \text{ g O}_2}{32 \text{ g}} \times \frac{1 \text{ mol O}_2}{11 \text{ O}_2} = 0.17 \text{ mol O}_2 \times \frac{8 \text{ SO}_2}{11 \text{ O}_2} = 0.12 \text{ mol SO}_2 \times \frac{64 \text{ g SO}_2}{1 \text{ mol}} = 7.68 \text{ g SO}_2$$

b) What is the limiting reactant?  $\text{O}_2$