

Name:

Stoichiometry Worksheet



a. How many moles of HF are needed to react with 0.300 mol of Na_2SiO_3 ?

$$0.300 \text{ mol Na}_2\text{SiO}_3 \times \frac{8 \text{ mol HF}}{1 \text{ mol Na}_2\text{SiO}_3} = 2.40 \text{ mol HF}$$

b. How many grams of NaF form when 0.500 mol of HF reacts with excess Na_2SiO_3 ?

$$0.500 \text{ mol HF} \times \frac{2 \text{ mol NaF}}{8 \text{ mol HF}} \times \frac{42.0 \text{ g NaF}}{1 \text{ mol NaF}} = 5.25 \text{ g NaF}$$

c. How many grams of Na_2SiO_3 can react with 0.800 g of HF?

$$0.800 \text{ g HF} \times \frac{1 \text{ mol HF}}{19.9 \text{ g HF}} \times \frac{1 \text{ mol Na}_2\text{SiO}_3}{8 \text{ mol HF}} \times \frac{122 \text{ g Na}_2\text{SiO}_3}{1 \text{ mol Na}_2\text{SiO}_3} = 0.613 \text{ g Na}_2\text{SiO}_3$$



a. How many moles of CO_2 are produced when 0.400 mol of $\text{C}_6\text{H}_{12}\text{O}_6$ reacts in this fashion?

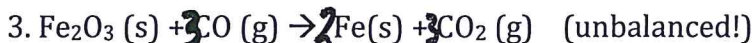
$$0.400 \text{ mol C}_6\text{H}_{12}\text{O}_6 \times \frac{2 \text{ mol CO}_2}{1 \text{ mol C}_6\text{H}_{12}\text{O}_6} = 0.800 \text{ mol CO}_2$$

b. How many grams of $\text{C}_6\text{H}_{12}\text{O}_6$ are needed to form 7.50 g of $\text{C}_2\text{H}_5\text{OH}$?

$$7.50 \text{ g C}_2\text{H}_5\text{OH} \times \frac{1 \text{ mol C}_2\text{H}_5\text{OH}}{46.1 \text{ g C}_2\text{H}_5\text{OH}} \times \frac{1 \text{ mol C}_6\text{H}_{12}\text{O}_6}{2 \text{ mol C}_2\text{H}_5\text{OH}} \times \frac{180. \text{ g C}_6\text{H}_{12}\text{O}_6}{1 \text{ mol C}_6\text{H}_{12}\text{O}_6} = 14.7 \text{ g C}_6\text{H}_{12}\text{O}_6$$

c. How many grams of CO_2 form when 7.50 g of $\text{C}_2\text{H}_5\text{OH}$ are produced?

$$7.50 \text{ g C}_2\text{H}_5\text{OH} \times \frac{1 \text{ mol C}_2\text{H}_5\text{OH}}{46.1 \text{ g C}_2\text{H}_5\text{OH}} \times \frac{2 \text{ mol CO}_2}{2 \text{ mol C}_2\text{H}_5\text{OH}} \times \frac{44.0 \text{ g CO}_2}{1 \text{ mol CO}_2} = 7.16 \text{ g CO}_2$$



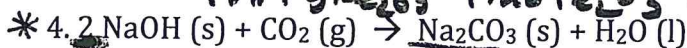
a. Calculate the number of grams of CO that can react with 0.150 kg of Fe_2O_3

$$0.150 \text{ kg Fe}_2\text{O}_3 \times \frac{1000 \text{ g Fe}_2\text{O}_3}{1 \text{ kg}} \times \frac{1 \text{ mol Fe}_2\text{O}_3}{159.7 \text{ g Fe}_2\text{O}_3} \times \frac{3 \text{ mol CO}}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{28.0 \text{ g CO}}{1 \text{ mol CO}} = 78.9 \text{ g CO}$$

b. Calculate the number of grams of Fe and the number of grams of CO₂ formed when 0.150 kg of Fe₂O₃ reacts

$$150 \text{ g Fe}_2\text{O}_3 \times \frac{1 \text{ mol}}{159.7 \text{ g Fe}_2\text{O}_3} \times \frac{2 \text{ mol CO}_2}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{44.0 \text{ g CO}_2}{1 \text{ mol CO}_2} = 124 \text{ g CO}_2$$

$$150 \text{ g Fe}_2\text{O}_3 \times \frac{1 \text{ mol Fe}_2\text{O}_3}{159.7 \text{ g Fe}_2\text{O}_3} \times \frac{2 \text{ mol Fe}}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{55.85 \text{ g Fe}}{1 \text{ mol Fe}} = 105 \text{ g Fe}$$



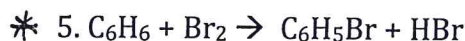
a. Which reagent is the limiting reactant when 1.85 mol NaOH and 1.00 mol CO₂ are allowed to react? pg 370

<u>moles of reagent</u>	<u>coefficient of reagent</u>
$\frac{1.85 \text{ mol NaOH}}{2} = 0.925 \text{ mol NaOH}$	$\frac{1.00 \text{ mol CO}_2}{1} = 1.00 \text{ mol CO}_2$

L.R. = NaOH

b. How many moles of Na₂CO₃ can be produced?

$$1.85 \text{ mol NaOH} \times \frac{1 \text{ mol Na}_2\text{CO}_3}{2 \text{ mol NaOH}} = 0.925 \text{ mol Na}_2\text{CO}_3$$



a. What is the theoretical yield of C₆H₅Br in this reaction when 30.0 g of C₆H₆ reacts with 65.0 g of Br₂?

$$30 \text{ g C}_6\text{H}_6 \times \frac{1 \text{ mol C}_6\text{H}_6}{78.12 \text{ g C}_6\text{H}_6} = 0.384 \text{ mol C}_6\text{H}_6$$

$$65.0 \text{ g Br}_2 \times \frac{1 \text{ mol Br}_2}{159.8 \text{ g Br}_2} = 0.4067 \text{ mol Br}_2$$

$$30 \text{ g C}_6\text{H}_6 \times \frac{1 \text{ mole}}{78.12 \text{ g C}_6\text{H}_6} \times \frac{1 \text{ mole}}{1 \text{ mole}} \times \frac{157.0 \text{ g}}{1 \text{ mole C}_6\text{H}_5\text{Br}} = 60.3 \text{ g}$$

b. If the actual yield of C₆H₅Br was 56.7 g, what is the percent yield?

$$\frac{56.7}{60.3} \times 100 = 94\%$$