

Stoichiometry Worksheet C

Name KEY



a. How many moles of HF are need to react with 0.600 mol of Na_2SiO_3 ?

$$0.600 \text{ mol Na}_2\text{SiO}_3 \times \frac{8 \text{ mol HF}}{1 \text{ mol Na}_2\text{SiO}_3} = \boxed{4.8 \text{ moles HF}}$$

b. How many grams of NaF form when 0.800 mol of HF reacts with excess Na_2SiO_3 ?

$$0.800 \text{ mol HF} \times \frac{2 \text{ mol NaF}}{8 \text{ mol HF}} \times \frac{41.99 \text{ g NaF}}{1 \text{ mol NaF}} = \boxed{8.4 \text{ g NaF}}$$

c. How many grams of Na_2SiO_3 can react with 0.900 g of HF?

$$0.900 \text{ g HF} \times \frac{1 \text{ mol HF}}{20 \text{ g HF}} \times \frac{1 \text{ mol Na}_2\text{SiO}_3}{8 \text{ mol HF}} \times \frac{122 \text{ g Na}_2\text{SiO}_3}{1 \text{ mol Na}_2\text{SiO}_3} =$$

$$\boxed{0.686 \text{ g Na}_2\text{SiO}_3}$$



a. How many moles of CO_2 are produced when 0.200 mol of $\text{C}_6\text{H}_{12}\text{O}_6$ reacts in this fashion?

$$0.200 \text{ mol C}_6\text{H}_{12}\text{O}_6 \times \frac{2 \text{ mol CO}_2}{1 \text{ mol C}_6\text{H}_{12}\text{O}_6} = \boxed{0.400 \text{ mol CO}_2}$$

b. How many grams of $\text{C}_6\text{H}_{12}\text{O}_6$ are need to form 8.50 g of $\text{C}_2\text{H}_5\text{OH}$?

$$8.5 \text{ g C}_2\text{H}_5\text{OH} \times \frac{1 \text{ mol C}_2\text{H}_5\text{OH}}{46 \text{ g C}_2\text{H}_5\text{OH}} \times \frac{1 \text{ mol C}_6\text{H}_{12}\text{O}_6}{2 \text{ mol C}_2\text{H}_5\text{OH}} \times \frac{180 \text{ g C}_6\text{H}_{12}\text{O}_6}{1 \text{ mol C}_6\text{H}_{12}\text{O}_6} = \boxed{16.6 \text{ g C}_6\text{H}_{12}\text{O}_6}$$

c. How many grams of CO_2 form when 8.50 g of $\text{C}_2\text{H}_5\text{OH}$ are produced?

$$8.5 \text{ g C}_2\text{H}_5\text{OH} \times \frac{1 \text{ mol C}_2\text{H}_5\text{OH}}{46 \text{ g C}_2\text{H}_5\text{OH}} \times \frac{2 \text{ mol CO}_2}{2 \text{ mol C}_2\text{H}_5\text{OH}} \times \frac{44 \text{ g CO}_2}{1 \text{ mol CO}_2} = \boxed{8.1 \text{ g CO}_2}$$



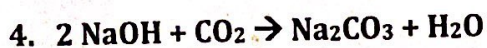
a. Calculate the number of grams of CO that can react with 250 g of Fe_2O_3 .

$$250 \text{ g Fe}_2\text{O}_3 \times \frac{1 \text{ mol Fe}_2\text{O}_3}{160 \text{ g Fe}_2\text{O}_3} \times \frac{3 \text{ mol CO}}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{28 \text{ g CO}}{1 \text{ mol CO}} = \boxed{131 \text{ g CO}}$$

b. Calculate the number of grams of Fe and the number of grams of CO_2 formed when 250 grams of Fe_2O_3 reacts.

$$250 \text{ g Fe}_2\text{O}_3 \times \frac{1 \text{ mol Fe}_2\text{O}_3}{160 \text{ g Fe}_2\text{O}_3} \times \frac{3 \text{ mol CO}_2}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{44 \text{ g CO}_2}{1 \text{ mol CO}_2} = \boxed{59 \text{ g CO}_2}$$

$$250 \text{ g Fe}_2\text{O}_3 \times \frac{1 \text{ mol Fe}_2\text{O}_3}{160 \text{ g Fe}_2\text{O}_3} \times \frac{2 \text{ mol Fe}}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{56 \text{ g Fe}}{1 \text{ mol Fe}} = \boxed{175 \text{ g Fe}}$$



a. How many moles of Na_2CO_3 can be produced when 1.00 mole CO_2 reacts?

$$1.00 \text{ mol CO}_2 \times \frac{1 \text{ mol Na}_2\text{CO}_3}{1 \text{ mol CO}_2} = \boxed{1 \text{ mol Na}_2\text{CO}_3}$$

b. How many moles of Na_2CO_3 can be produced when 1.85 mol NaOH reacts?

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



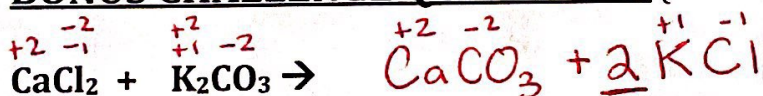
a. What is the theoretical yield of $\text{C}_6\text{H}_5\text{Br}$ in this reaction when 30.0 g of C_6H_6 reacts with 65.0 g of Br_2 ?

$$30 \text{ g C}_6\text{H}_6 \times \frac{1 \text{ mol C}_6\text{H}_6}{78 \text{ g C}_6\text{H}_6} \times \frac{1 \text{ mol C}_6\text{H}_5\text{Br}}{1 \text{ mol C}_6\text{H}_6} \times \frac{157 \text{ g C}_6\text{H}_5\text{Br}}{1 \text{ mol C}_6\text{H}_5\text{Br}} = \boxed{60.4 \text{ g C}_6\text{H}_5\text{Br}}$$

b. If the actual yield of $\text{C}_6\text{H}_5\text{Br}$ was 56.7 g, what is the percent yield?

$$\frac{56.7 \text{ g}}{60.4 \text{ g}} \times 100 = \boxed{93.9\%}$$

BONUS CHALLENGE QUESTION!!! (Combining almost every topic from this Unit)



1- Classify the reaction type: double displacement

2- Predict the products (write them in above)

3- Balance the reaction (write the balanced equation above)

4- Answer the question: If you have 32 grams CaCl_2 , how many grams of Potassium Chloride do you expect to produce?

$$32 \text{ g CaCl}_2 \times \frac{1 \text{ mol CaCl}_2}{111 \text{ g CaCl}_2} \times \frac{2 \text{ mol KCl}}{1 \text{ mol CaCl}_2} \times \frac{74 \text{ g KCl}}{1 \text{ mol KCl}} = \boxed{42.7 \text{ g KCl}}$$

5- If 55 grams of Potassium Chloride are produced when you perform the reaction, what is your percent yield?

$$\frac{55 \text{ g}}{42.7 \text{ g}} \times 100 = \boxed{129\%}$$

6- Translate your equation above into words

Calcium Chloride reacts with Potassium Carbonate to create Calcium Carbonate and Potassium Chloride