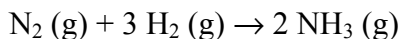


WKS
Gas Stoichiometry

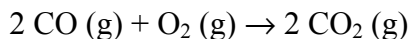
NAME Answer Key
Period _____ Date _____

1. What volume of nitrogen gas at STP is needed to react with 57.0 mL of hydrogen, also at STP?



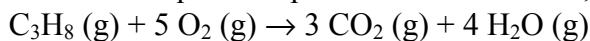
$$? \text{ mL N}_2 = 57.0 \text{ mL H}_2 \times \frac{1 \text{ mL N}_2}{3 \text{ mL H}_2} = \boxed{19.0 \text{ mL N}_2}$$

2. What volume of oxygen gas at 20.0°C and 0.953 atm is needed to react with 3.500×10^3 L of CO, also at 20.0°C and 0.953 atm?



$$? \text{ L O}_2 = 3.500 \times 10^3 \text{ L CO} \times \frac{1 \text{ L O}_2}{2 \text{ L CO}} = \boxed{1.750 \times 10^3 \text{ L O}_2}$$

3. What volume of oxygen gas at STP is required to produce 640. L of CO₂, also measured at STP?

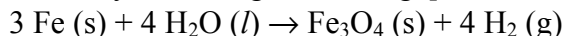


$$? \text{ L O}_2 = 640 \text{ L CO}_2 \times \frac{5 \text{ L O}_2}{3 \text{ L CO}_2} = \boxed{1070 \text{ L O}_2}$$

You could convert L to mol first, but notice that you would then “undo” that at the end:

$$? \text{ L O}_2 = 640 \text{ L CO}_2 \times \frac{1 \text{ mol CO}_2}{22.4 \text{ L CO}_2} \times \frac{5 \text{ mol O}_2}{3 \text{ mol CO}_2} \times \frac{22.4 \text{ L O}_2}{1 \text{ mol O}_2} = \boxed{1070 \text{ L O}_2}$$

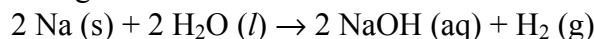
4. What volume of hydrogen gas can be produced at STP by the reaction of 6.28 g of Fe according to the following equation? [hint: where are you starting and ending?]



$$? \text{ L H}_2 = 6.28 \text{ g Fe} \times \frac{1 \text{ mol Fe}}{55.85 \text{ g Fe}} \times \frac{4 \text{ mol H}_2}{3 \text{ mol Fe}} \times \frac{22.4 \text{ L H}_2}{1 \text{ mol H}_2} = \boxed{3.36 \text{ L H}_2}$$

$\underbrace{\hspace{10em}}_{0.1124 \text{ mol Fe}}$
 $\underbrace{\hspace{10em}}_{0.1499 \text{ mol H}_2}$

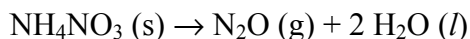
5. How many grams of sodium are needed to react with excess water according to the following equation, in order to produce 35.8 L of H₂ gas at STP?



$$? \text{ g Na} = 35.8 \text{ L H}_2 \times \frac{1 \text{ mol H}_2}{22.4 \text{ L H}_2} \times \frac{2 \text{ mol Na}}{1 \text{ mol H}_2} \times \frac{22.99 \text{ g Na}}{1 \text{ mol Na}} = \boxed{73.5 \text{ g Na}}$$

$\underbrace{\hspace{10em}}_{1.60 \text{ mol H}_2}$
 $\underbrace{\hspace{10em}}_{3.20 \text{ mol Na}}$

6. What mass of ammonium nitrate, NH₄NO₃, must decompose according to the following equation to produce 25.0 L of N₂O gas at STP?



$$? \text{ g NH}_4\text{NO}_3 = 25.0 \text{ L N}_2\text{O} \times \frac{1 \text{ mol N}_2\text{O}}{22.4 \text{ L N}_2\text{O}} \times \frac{1 \text{ mol NH}_4\text{NO}_3}{1 \text{ mol N}_2\text{O}} \times \frac{80.052 \text{ g NH}_4\text{NO}_3}{1 \text{ mol NH}_4\text{NO}_3} = \boxed{89.3 \text{ g NH}_4\text{NO}_3}$$

$\underbrace{\hspace{10em}}_{1.116 \text{ mol N}_2\text{O}}$
 $\underbrace{\hspace{10em}}_{1.116 \text{ mol NH}_4\text{NO}_3}$