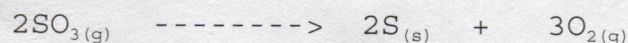


1. Given the reaction,



to produce 0.500 moles of sulfur:

- a.) how many moles of
- $\text{SO}_{3(s)}$
- are needed?

$$\text{SO}_3 : \text{S} = 2 : 2 = 1 : 1$$

$$\therefore \boxed{0.500 \text{ mole SO}_3}$$

- b.) how many liters of
- $\text{O}_{2(g)}$
- would also be produced?

$$\frac{3\text{O}_2}{2\text{SO}_3} (0.500 \text{ mole SO}_3) = \boxed{0.750 \text{ mole O}_2}$$

$$0.750 \text{ mole} \left( \frac{22.4 \text{ L}}{1 \text{ mol}} \right) = \boxed{16.8 \text{ L}}$$

2. For the reaction,

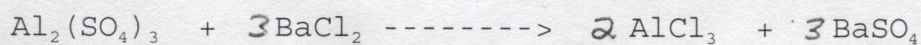
how many moles of  $\text{H}_2\text{O}$  gas will be formed reacting with  $8.318 \times 10^{22}$  molecules of  $\text{O}_{2(g)}$ ?

$$8.318 \times 10^{22} \left( \frac{1 \text{ mole}}{6.02 \times 10^{23}} \right) = \underline{0.1380 \text{ mole O}_2}$$

$$0.1380 \text{ mole O}_2 \left( \frac{2\text{H}_2\text{O}}{1\text{O}_2} \right) = \boxed{0.276 \text{ mole H}_2\text{O}}$$



3. If the following reaction occurs,



how many grams of barium chloride will be needed to react with 46.2 grams of aluminum sulfate?

$$\begin{array}{ccc}
 46.2 \text{ g} & & ? \text{ g} \\
 \downarrow \div 342.14 \text{ g/mol} & & \boxed{84.4 \text{ g}} \\
 & & \uparrow \times 208.23 \text{ g/mol} \\
 0.1350 \text{ mole} \xrightarrow{\times 3} 0.4051 \text{ mole}
 \end{array}$$

4. If the following reaction occurs,



how many grams of aluminum hydroxide are produced along with 12.0 liters of  $\text{CH}_4$ ?

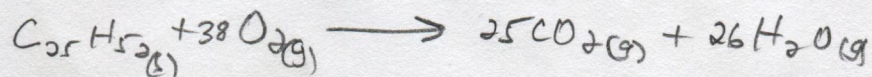
$$12.0 \text{ L CH}_4 \left( \frac{1 \text{ mole}}{22.4 \text{ L}} \right) = 0.5357 \text{ mole CH}_4 \quad ? \text{ g}$$

$$0.5357 \text{ mole CH}_4 \left( \frac{4 \text{ Al(OH)}_3}{3 \text{ CH}_4} \right) = 0.7143 \text{ mole Al(OH)}_3$$

$$0.7143 \text{ mole Al(OH)}_3 \left( \frac{78.00 \text{ g}}{1 \text{ mole}} \right) = \boxed{55.7 \text{ g Al(OH)}_3}$$

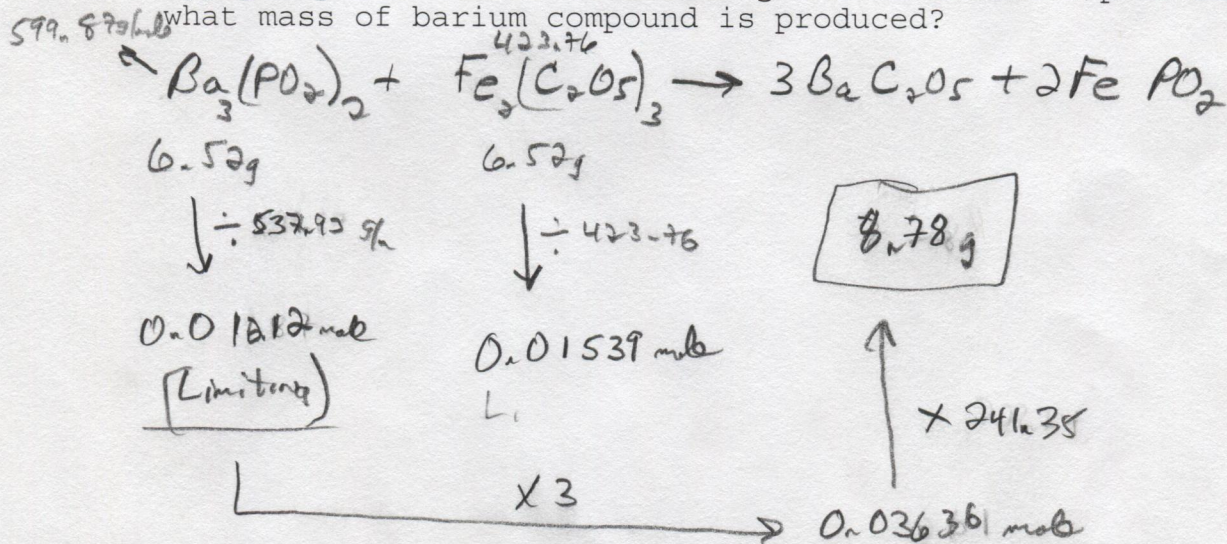


5. If 45.0 liters of oxygen are consumed when a candle made from paraffin ( $C_{25}H_{52}$ ) is burned, what volume of carbon dioxide is produced? (Water is the other product.)



$$45.0 L O_2 \left( \frac{25 CO_2}{38 O_2} \right) = \boxed{29.6 L CO_2}$$

6. In a double replacement reaction, when 6.52 grams of barium hypophosphite reacts with 6.52 grams of iron(III)peroxalate, what mass of barium compound is produced?



What reactant, and what mass of it, is in excess?

$$Fe_2(C_2O_5)_3 \text{ Remaining} = 0.01539 - 0.01087 = 0.00452 \text{ mol Left}$$

