

5.000 g ? g

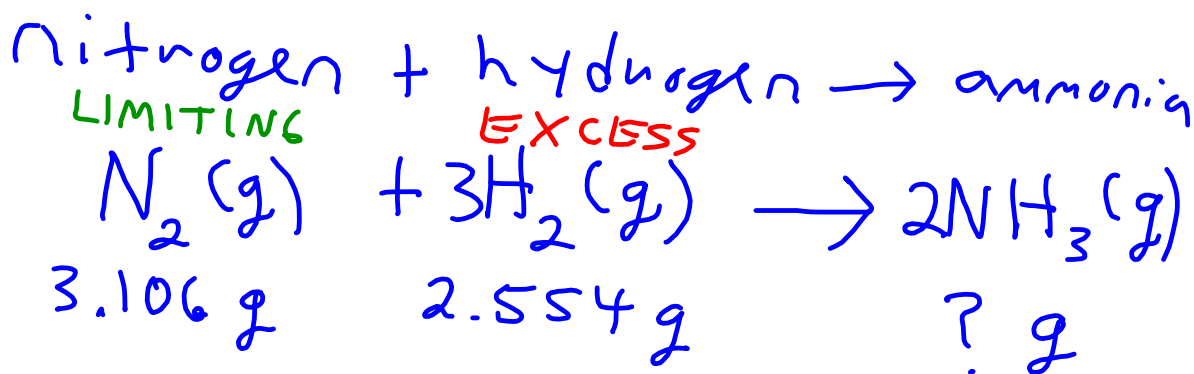
g H₂ → mol H₂ → mol O₂ → g O₂

$$\frac{5.000 \cancel{\text{g H}_2}}{1} \left(\frac{1 \cancel{\text{mol H}_2}}{2.016 \cancel{\text{g H}_2}} \right) \left(\frac{1 \cancel{\text{mol O}_2}}{2 \cancel{\text{mol H}_2}} \right) \left(\frac{32.00 \cancel{\text{g O}_2}}{1 \cancel{\text{mol O}_2}} \right)$$

$$= 39.68 \text{ g O}_2$$

Nitrogen combines with hydrogen to form ammonia.

What mass of ammonia can be formed by a mixture containing 3.106 g of nitrogen and 2.554 g of hydrogen?



$$\frac{3.106 \text{ g } \cancel{\text{N}_2}}{1} \left(\frac{1 \text{ mol } \cancel{\text{N}_2}}{28.02 \text{ g } \cancel{\text{N}_2}} \right) \left(\frac{2 \text{ mol } \cancel{\text{NH}_3}}{1 \text{ mol } \cancel{\text{N}_2}} \right) \left(\frac{17.034 \text{ g } \cancel{\text{NH}_3}}{1 \text{ mol } \cancel{\text{NH}_3}} \right)$$

$$= 3.776 \text{ g } \text{NH}_3 \quad \checkmark$$



$$\frac{2.554 \text{ g } \cancel{\text{H}_2}}{1} \left(\frac{1 \text{ mol } \cancel{\text{H}_2}}{2.016 \text{ g } \cancel{\text{H}_2}} \right) \left(\frac{2 \text{ mol } \cancel{\text{NH}_3}}{3 \text{ mol } \cancel{\text{H}_2}} \right) \left(\frac{17.034 \text{ g } \cancel{\text{NH}_3}}{1 \text{ mol } \cancel{\text{NH}_3}} \right)$$

$$= 14.39 \text{ g } \text{NH}_3 \quad \times$$

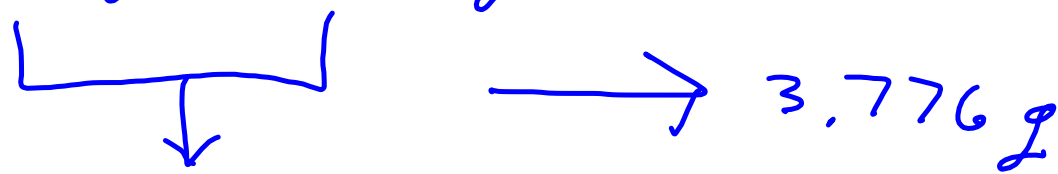
$$\begin{array}{r} 1.008 \\ \times 3 \\ \hline 3.024 \end{array}$$

$$\begin{array}{r} 14.01 \\ 3.024 \\ \hline 17.034 \end{array}$$

What mass of H_2 will be left over at the end of the reaction, assuming 100% yield?



3.106 g 2.554 g

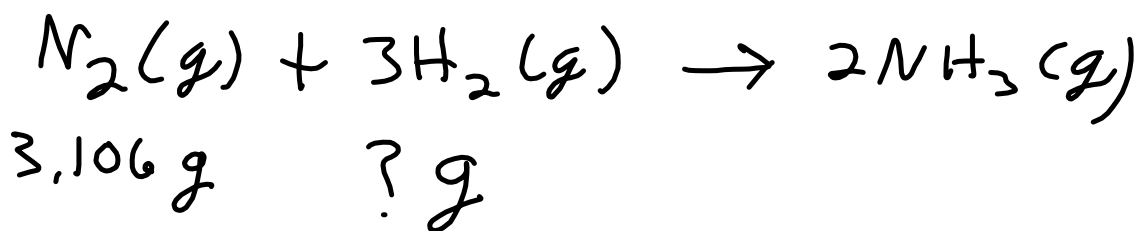


5.660 g TOTAL SYSTEM MASS

- 3.776 g MASS OF PRODUCT FORMED

1.884 g MASS OF EXCESS REACTANT LEFT OVER

	N_2	H_2	NH_3
BEGINNING	3.106 g	2.554 g	0.000 g
END	0,000 g	1.884 g	3.776 g



$$\text{g N}_2 \rightarrow \text{mol N}_2 \rightarrow \text{mol H}_2 \rightarrow \text{g H}_2$$

$$\frac{3.106 \cancel{\text{g N}_2}}{1} \left(\frac{1 \cancel{\text{mol N}_2}}{28.02 \cancel{\text{g N}_2}} \right) \left(\frac{3 \text{ mol H}_2}{1 \cancel{\text{mol N}_2}} \right) \left(\frac{2.016 \text{ g H}_2}{1 \text{ mol H}_2} \right)$$

$$= 0.670 \text{ g H}_2 \text{ (used)}$$

$$\begin{array}{r} 2.554 \text{ g H}_2 \text{ (available)} \\ - 0.670 \text{ g H}_2 \text{ (used)} \\ \hline 1.884 \text{ g H}_2 \text{ (remaining)} \end{array}$$