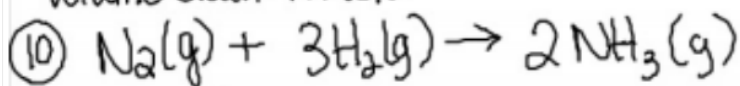


Volume Stoich. Homework:

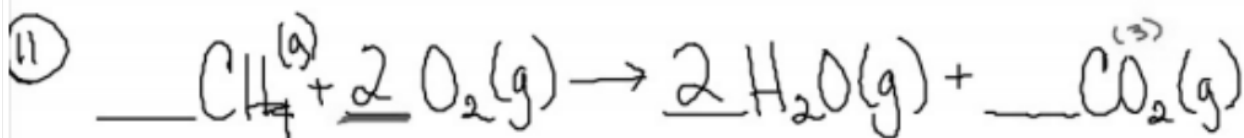


a) given: 31.8 L NH<sub>3</sub> need: ? L N<sub>2</sub> Type: Vol → Vol

$$31.8 \text{ L NH}_3 \times \frac{1 \text{ mol NH}_3}{22.4 \text{ L NH}_3} \times \frac{1 \text{ mol N}_2}{2 \text{ mol NH}_3} \times \frac{22.4 \text{ L N}_2}{1 \text{ mol N}_2} = \boxed{15.9 \text{ L N}_2}$$

b) given: 562.7 L N<sub>2</sub> need: ? L H<sub>2</sub> Type: Vol → Vol

$$562.7 \text{ L N}_2 \times \frac{1 \text{ mol N}_2}{22.4 \text{ L N}_2} \times \frac{3 \text{ mol H}_2}{1 \text{ mol N}_2} \times \frac{22.4 \text{ L H}_2}{1 \text{ mol H}_2} = \boxed{1688 \text{ L H}_2}$$



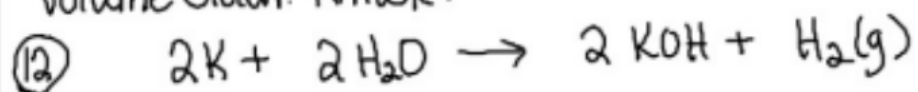
a) given: 10.0 L O<sub>2</sub> need: ? L CH<sub>4</sub> Type: Vol → Vol

$$10.0 \text{ L O}_2 \times \frac{1 \text{ mol O}_2^{(2)}}{22.4 \text{ L O}_2} \times \frac{1 \text{ mol CH}_4^{(3)}}{2 \text{ mol O}_2} \times \frac{22.4 \text{ L CH}_4^{(2)}}{1 \text{ mol CH}_4} = \boxed{5.00 \text{ L CH}_4}$$

b) given: 70.5 L CH<sub>4</sub> need: ? L CO<sub>2</sub> Type: Vol → Vol

$$70.5 \text{ L CH}_4 \times \frac{1 \text{ mol CH}_4}{22.4 \text{ L CH}_4} \times \frac{1 \text{ mol CO}_2}{1 \text{ mol CH}_4} \times \frac{22.4 \text{ L CO}_2}{1 \text{ mol CO}_2} = \boxed{70.5 \text{ L CO}_2}$$

Volume Stoich. Homework:

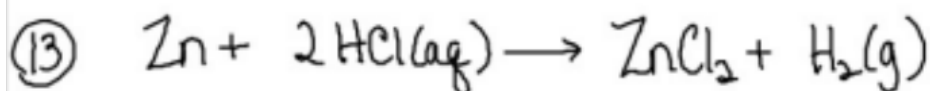


a) given: 20.0g K need: ? L H<sub>2</sub> Type: mass → vol

$$20.0g K \times \frac{1 \text{ mol K}}{39.10g K} \times \frac{1 \text{ mol H}_2}{2 \text{ mol K}} \times \frac{22.4L H_2}{1 \text{ mol H}_2} = \boxed{5.73 L H_2}$$

b) given: 23.0L H<sub>2</sub> need: ? g H<sub>2</sub>O Type: vol → mass

$$23.0L H_2 \times \frac{1 \text{ mol H}_2}{22.4L H_2} \times \frac{2 \text{ mol H}_2O}{1 \text{ mol H}_2} \times \frac{18.02g H_2O}{1 \text{ mol}} = \boxed{37.0g H_2O}$$



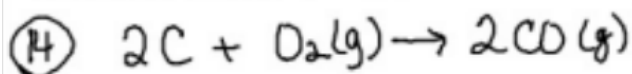
a) given: 60.70L H<sub>2</sub> need: ? g Zn Type: vol → mass

$$60.70L H_2 \times \frac{1 \text{ mol H}_2}{22.4L H_2} \times \frac{1 \text{ mol Zn}}{1 \text{ mol H}_2} \times \frac{65.39g Zn}{1 \text{ mol Zn}} = \boxed{177.2g Zn}$$

b) given: 47.8g HCl need: ? L H<sub>2</sub> Type: mass → vol

$$47.8g HCl \times \frac{1 \text{ mol HCl}}{36.46g HCl} \times \underbrace{\frac{1 \text{ mol H}_2}{2 \text{ mol HCl}}}_{\text{molar ratio}} \times \frac{22.4L H_2}{1 \text{ mol H}_2} = \boxed{14.7 L H_2}$$

Volume Stöich. Antwort:

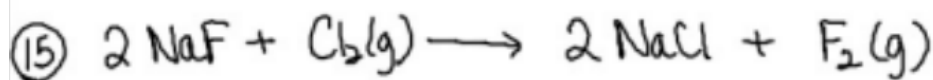


a) given: 34.2 L CO need: ? g C Type: Vol  $\rightarrow$  mass

$$34.2 \text{ L CO} \times \frac{1 \text{ mol CO}}{22.4 \text{ L CO}} \times \frac{2 \text{ mol C}}{2 \text{ mol CO}} \times \frac{12.01 \text{ g C}}{1 \text{ mol C}} = \boxed{18.3 \text{ g C}}$$

b) given: 21.9 g C need: ? L O<sub>2</sub>(g) Type: mass  $\rightarrow$  vol

$$21.9 \text{ g C} \times \frac{1 \text{ mol C}}{12.01 \text{ g C}} \times \frac{1 \text{ mol O}_2}{2 \text{ mol C}} \times \frac{22.4 \text{ L O}_2}{1 \text{ mol O}_2} = \boxed{20.4 \text{ L O}_2}$$

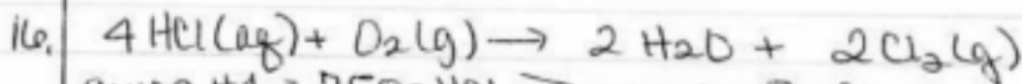


a) given: 88.0 L Cl<sub>2</sub> need: ? g NaCl Type: Vol  $\rightarrow$  mass

$$88.0 \text{ L Cl}_2 \times \frac{1 \text{ mol Cl}_2}{22.4 \text{ L Cl}_2} \times \frac{2 \text{ mol NaCl}}{1 \text{ mol Cl}_2} \times \frac{58.45 \text{ g NaCl}}{1 \text{ mol NaCl}} = \boxed{459 \text{ g NaCl}}$$

b) given: 97.8 g NaF need: ? L F<sub>2</sub> Type: mass  $\rightarrow$  vol

$$97.8 \text{ g NaF} \times \frac{1 \text{ mol NaF}}{42.00 \text{ g NaF}} \times \underbrace{\frac{1 \text{ mol F}_2}{2 \text{ mol NaF}}}_{\text{molar ratio}} \times \frac{22.4 \text{ L F}_2}{1 \text{ mol F}_2} = \boxed{26.1 \text{ L F}_2}$$



given #1 = 750g HCl } needed = ? g Cl<sub>2</sub>  
 given #2 = 320g O<sub>2</sub> }

theo. yield

$$\frac{750 \text{g}}{729.22 \text{Cl}_2}$$

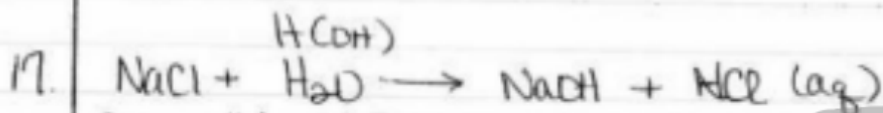
TY

LF  
Limiting factor

$$750 \text{g HCl} \times \frac{1 \text{ mol HCl}}{36.46 \text{g HCl}} \times \frac{2 \text{ mol Cl}_2}{4 \text{ mol HCl}} \times \frac{70.90 \text{g Cl}_2}{1 \text{ mol Cl}_2} =$$

$$320 \text{g O}_2 \times \frac{1 \text{ mol O}_2}{32.00 \text{g O}_2} \times \frac{2 \text{ mol Cl}_2}{1 \text{ mol O}_2} \times \frac{70.90 \text{g Cl}_2}{1 \text{ mol Cl}_2} =$$

$$\frac{1400 \text{g Cl}_2}{1420 \text{g Cl}_2}$$

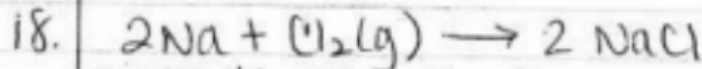


given #1 = 645g NaCl } needed = ? g NaOH  
 given #2 = 290g H<sub>2</sub>O }

smaller

LF  $645 \text{g NaCl} \times \frac{1 \text{ mol NaCl}}{58.45 \text{g NaCl}} \times \frac{1 \text{ mol NaOH}}{1 \text{ mol NaCl}} \times \frac{40.01 \text{g NaOH}}{1 \text{ mol NaOH}} = 441 \text{g NaOH}$

$$290 \text{g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{g H}_2\text{O}} \times \frac{1 \text{ mol NaOH}}{1 \text{ mol H}_2\text{O}} \times \frac{40.01 \text{g NaOH}}{1 \text{ mol NaOH}} = 644 \text{g NaOH}$$

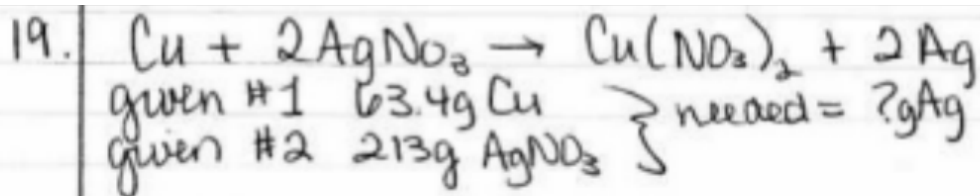


given #1 = 50.0g Na } needed: ? g NaCl  
 given #2 = 30.0L Cl<sub>2</sub> }

theo yield

LF  $50.0 \text{g Na} \times \frac{1 \text{ mol Na}}{23.00 \text{g Na}} \times \frac{2 \text{ mol NaCl}}{2 \text{ mol Na}} \times \frac{58.45 \text{g NaCl}}{1 \text{ mol NaCl}} = 127 \text{g NaCl}$

$$30.0 \text{L Cl}_2 \times \frac{1 \text{ mol Cl}_2}{22.4 \text{L Cl}_2} \times \frac{2 \text{ mol NaCl}}{1 \text{ mol Cl}_2} \times \frac{58.45 \text{g NaCl}}{1 \text{ mol NaCl}} = 157 \text{g NaCl}$$

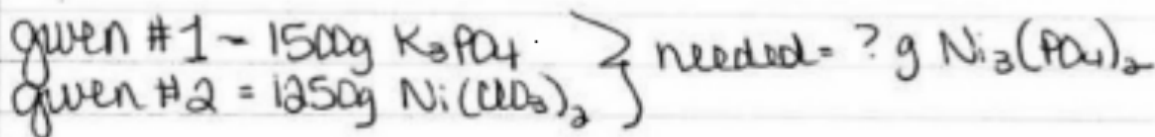
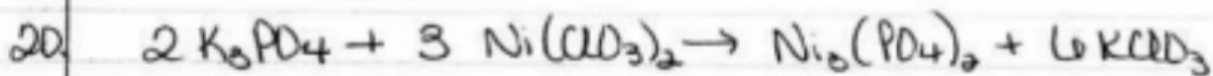


$$63.4\text{g Cu} \times \frac{1\text{mol Cu}}{63.55\text{g Cu}} \times \frac{2\text{mol Ag}}{1\text{mol Cu}} \times \frac{107.9\text{g Ag}}{1\text{mol Ag}} = 215\text{g Ag}$$

Limiting factor  $213\text{g AgNO}_3 \times \frac{1\text{mol AgNO}_3}{169.91\text{g AgNO}_3} \times \frac{2\text{mol Ag}}{2\text{mol AgNO}_3} \times \frac{107.9\text{g Ag}}{1\text{mol Ag}} = \boxed{135\text{g Ag}}$  Theoretical yield

actual yield  $\rightarrow \frac{104.9\text{g}}{135\text{g}} \times 100 = \boxed{77.7\% \text{ yield}}$

T.y  $\rightarrow 135\text{g}$



$$1500\text{g K}_3\text{PO}_4 \times \frac{1\text{mol K}_3\text{PO}_4}{212.27\text{g K}_3\text{PO}_4} \times \frac{1\text{mol Ni}_3(\text{PO}_4)_2}{2\text{mol K}_3\text{PO}_4} \times \frac{316.01\text{g Ni}_3(\text{PO}_4)_2}{1\text{mol Ni}_3(\text{PO}_4)_2} = \frac{1293}{1300}\text{g Ni}_3(\text{PO}_4)_2$$

Limiting factor

$$\boxed{1250\text{g Ni}(\text{ClO}_3)_2} \times \frac{1\text{mol Ni}(\text{ClO}_3)_2}{225.59\text{g Ni}(\text{ClO}_3)_2} \times \frac{1\text{mol Ni}_3(\text{PO}_4)_2}{3\text{mol Ni}(\text{ClO}_3)_2} \times \frac{316.01\text{g Ni}_3(\text{PO}_4)_2}{1\text{mol Ni}_3(\text{PO}_4)_2} = \boxed{676\text{g Ni}_3(\text{PO}_4)_2}$$

theo yield

$$\frac{658\text{g}}{676\text{g}} \times 100 = 97.3\% \text{ yield}$$

$$\frac{\text{actual}}{\text{theo}} \times 100$$



7H

$$7 \text{ mol H} \times \frac{1 \text{ mol H}_2\text{CM}_2}{2 \text{ mol H}} = 3.5 \text{ H}_2\text{CM}_2$$