

CHM151 Q3b 25 Pts Fall 2005 Name: Key

Information: mole = 6.02×10^{23} , molar masses: S = 32.06, Al = 27.0

Ba = 137.3, C = 12.01, H = 1.01, N = 14.01, Si = 28.1, O = 16.00, P = 31.0, Xe = 131.3, F = 19.0, K = 39.1

SHOW ALL WORK FOR CREDIT.

1. (4 Pts) a. Calculate the formula weight of $\text{Ba}(\text{NO}_3)_2$.

$$\begin{array}{l} 2 \times 16.00 = 96.00 \\ 2 \times 14.01 = 28.02 \\ 1 \times 137.3 = 137.3 \end{array}$$

b. Calculate the % O in $\text{Ba}(\text{NO}_3)_2$.

$$\underline{261.32}$$

$$\frac{96.00}{261.32} \times 100 = \underline{36.737\% \text{ O}}$$

2. (4 Pts) What is the mass in grams of 0.832 moles of $\text{Ba}(\text{NO}_3)_2$?

$$\frac{0.832 \text{ moles}}{1} \times \frac{261.32 \text{ g}}{\text{mole}} = \underline{217.42 \text{ g}}$$

3. (4 Pts) How many sulfur atoms are there in 15.0 grams of sulfur?

$$\frac{15.0 \text{ g S}}{32.06 \text{ g}} \times \frac{6.02 \times 10^{23} \text{ Atoms}}{\text{mole}} = \underline{2.82 \times 10^{23} \text{ S Atoms}}$$

4. (4 Pts) The first chemical compound containing a noble gas was prepared in 1962. What is the empirical formula for the compound that is 67.2% xenon and 32.8% oxygen by mass?

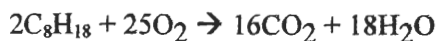
Assume 100 g:

$$\text{Xe: } \frac{67.2 \text{ g}}{131.3 \text{ g}} \times \frac{\text{mol}}{\text{mol}} = 0.5118 \div 0.5118 = 1$$

$$\text{O: } \frac{32.8 \text{ g}}{16.00 \text{ g}} \times \frac{\text{mol}}{\text{mol}} = 2.05 \div 0.5118 = 4$$



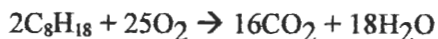
5. (5 Pts) How many moles of CO_2 will be produced from the complete combustion of 20.0 grams of C_8H_{18} ?



20.0g ? moles

$$\frac{20.0 \text{ g } \text{C}_8\text{H}_{18}}{114.26 \text{ g}} \times \frac{16 \text{ mol } \text{CO}_2}{2 \text{ mol } \text{C}_8\text{H}_{18}} = \underline{1.40 \text{ mol } \text{CO}_2}$$

6. (4 Pts) How many moles of H_2O would be produced from 36 moles of O_2 according to the following balanced equation?



36 mol ? mol

$$\frac{36 \text{ mol } \text{O}_2}{25 \text{ mol } \text{O}_2} \times 18 \text{ mol } \text{H}_2\text{O} = \underline{25.92 \text{ mol } \text{H}_2\text{O}}$$