

Name _____
 Teacher _____
 Class _____ Block _____
 Date _____

Word Equations Stoichiometry Worksheet 2

Write the balanced chemical equations for each of the following chemical reactions.

- 1) When dissolved beryllium chloride reacts with dissolved silver nitrate in water, aqueous beryllium nitrate and silver chloride powder are made. What is the theoretical yield if you have 7.2 g of both reactants?



$$7.2\text{g BeCl}_2 \times \frac{1\text{mol BeCl}_2}{79.912\text{g BeCl}_2} \times \frac{2\text{mol AgCl}}{1\text{mol BeCl}_2} \times \frac{143.35\text{g AgCl}}{1\text{mol AgCl}} = 25.83\text{g}$$

$$7.2\text{g AgNO}_3 \times \frac{1\text{mol AgNO}_3}{169.91\text{g AgNO}_3} \times \frac{2\text{mol AgCl}}{2\text{mol AgNO}_3} \times \frac{143.35\text{g AgCl}}{1\text{mol AgCl}} = 6.07\text{g}$$

6.07g AgCl because AgNO₃ is limiting.

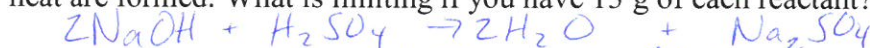
- 2) When isopropanol (C₃H₈O) burns in oxygen, carbon dioxide, water, and heat are produced. How many grams of water are produced if you have excess oxygen and 0.5 g of isopropanol?



$$0.5\text{g C}_3\text{H}_8\text{O} \times \frac{1\text{mol C}_3\text{H}_8\text{O}}{60.11\text{g C}_3\text{H}_8\text{O}} \times \frac{8\text{mol H}_2\text{O}}{2\text{mol C}_3\text{H}_8\text{O}} \times \frac{18.02\text{g H}_2\text{O}}{1\text{mol H}_2\text{O}} = 0.5995$$

0.6g H₂O

- 3) When dissolved sodium hydroxide reacts with sulfuric acid (H₂SO₄), aqueous sodium sulfate, water, and heat are formed. What is limiting if you have 13 g of each reactant?



Reactant vs. Reactant

$$13\text{g NaOH} \times \frac{1\text{mol NaOH}}{40.01\text{g NaOH}} \times \frac{1\text{mol H}_2\text{SO}_4}{2\text{mol NaOH}} \times \frac{98.12\text{g H}_2\text{SO}_4}{1\text{mol H}_2\text{SO}_4} = 15.9\text{g H}_2\text{SO}_4$$

only 13g is available

Reactant vs. Product

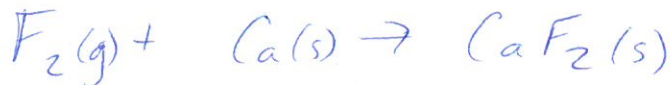
$$13\text{g NaOH} \times \frac{1\text{mol NaOH}}{40.01\text{g NaOH}} \times \frac{2\text{mol H}_2\text{O}}{2\text{mol NaOH}} \times \frac{18.02\text{g H}_2\text{O}}{1\text{mol H}_2\text{O}} = 5.855\text{g H}_2\text{O}$$

Product

$$13\text{g H}_2\text{SO}_4 \times \frac{1\text{mol H}_2\text{SO}_4}{98.12\text{g H}_2\text{SO}_4} \times \frac{2\text{mol H}_2\text{O}}{1\text{mol H}_2\text{SO}_4} \times \frac{18.02\text{g H}_2\text{O}}{1\text{mol H}_2\text{O}} = 4.775\text{g H}_2\text{O}$$

Smaller product amount

- 4) When fluorine gas is put into contact with calcium metal at high temperatures, calcium fluoride powder is created in an exothermic reaction. How many grams of calcium fluoride are produced with 0.05 g of fluorine? What is the actual mass if you have 125% yield? How can you get more than 100%?



$$0.05 \text{ g } F_2 \times \frac{1 \text{ mol } F_2}{38 \text{ g } F_2} \times \frac{1 \text{ mol } CaF_2}{1 \text{ mol } F_2} \times \frac{78.08 \text{ g } CaF_2}{1 \text{ mol } CaF_2} = 0.1027$$

$$\frac{A}{T} \times 100 = 125\% = 1.25 = \frac{A}{0.1027 \text{ g}} \quad A = 0.128 \text{ 1sf} \rightarrow \boxed{0.1 \text{ g } CaF_2}$$

extra was put into the reaction. It was contaminated.

- 5) When sodium metal reacts with iron (II) chloride, iron metal and sodium chloride are formed. What mass of iron is produced from 14 g of sodium? What is the actual mass if you have 75% yield? Why is it less than 100%?



$$14 \text{ g } Na \times \frac{1 \text{ mol } Na}{22.99 \text{ g } Na} \times \frac{1 \text{ mol } Fe}{2 \text{ mol } Na} \times \frac{55.847 \text{ g } Fe}{1 \text{ mol } Fe} = 17 \text{ g } Fe$$

$$\frac{A}{T} \times 100 = 75\% = .75 = \frac{A}{17 \text{ g}} \quad A = 12.75 = \boxed{13 \text{ g } Fe}$$

Something was spilled while mixing or lost during the reaction.