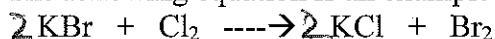


Name: _____
 Period: _____

Limiting Reactants and Percent Yield

1) Chlorine can replace bromine in bromide compounds forming a chloride compound and elemental bromine. The following equation is an example of this reaction.



When 0.855 mole of Cl_2 and 3.305 g of KBr are mixed in solution, which is the limiting reactant? How many grams of Br_2 are formed?

$\text{KBr} = \text{limiting}$

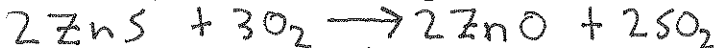
$$\frac{3.305 \text{ g KBr}}{114 \text{ g KBr}} \times \frac{1 \text{ mol KBr}}{2 \text{ mol KBr}} \times \frac{1 \text{ mol Br}_2}{1 \text{ mol Br}_2} = \boxed{0.0139 \text{ mol Br}_2}$$

$$\frac{0.855 \text{ mol Cl}_2}{1 \text{ mol Cl}_2} \times \frac{1 \text{ mol Br}_2}{1 \text{ mol Cl}_2} = \boxed{0.855 \text{ mol Br}_2}$$

$$\frac{0.0139 \text{ mol Br}_2}{1 \text{ mol Br}_2} \times 159.8 \text{ g Br}_2 = \boxed{2.22 \text{ g Br}_2}$$

2) Heating zinc sulfide in the presence of oxygen yields zinc oxide and sulfur dioxide:

If 1.72 mol of ZnS is heated in the presence of 3.04 mol O_2 , which reactant will get used up first and which one would be left over?



$$\frac{1.72 \text{ mol ZnS}}{1 \text{ mol ZnS}} \times \frac{1 \text{ mol ZnO}}{1 \text{ mol ZnS}} = \boxed{1.72 \text{ mol ZnS}}$$

$$\frac{3.04 \text{ mol O}_2}{3 \text{ mol O}_2} \times \frac{2 \text{ mol ZnS}}{2 \text{ mol ZnS}} = \boxed{2.07 \text{ mol ZnS}}$$

$\text{ZnS} = \text{limiting}$
 $\text{O}_2 = \text{Excess}$

3) In the production of copper from ore containing copper(II) sulfide and reacting it with oxygen gas producing copper (II) oxide and sulfur dioxide. If 100 g of CuS and 56 g of O_2 are available, which reactant is limiting, and which is the excess reactant?

What is the mass of CuO produced?

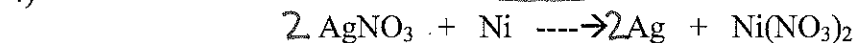


$$\frac{100 \text{ g CuS}}{95.5 \text{ g CuS}} \times \frac{1 \text{ mol CuS}}{1 \text{ mol CuS}} \times \frac{1 \text{ mol CuO}}{1 \text{ mol CuS}} = \boxed{1.23 \text{ mol CuO}}$$

Limiting = CuS
 Excess = O_2

$$\frac{56 \text{ g O}_2}{32 \text{ g O}_2} \times \frac{1 \text{ mol O}_2}{3 \text{ mol O}_2} \times \frac{2 \text{ mol CuO}}{2 \text{ mol CuO}} = \boxed{1.167 \text{ mol CuO}}$$

$$\frac{1.167 \text{ mol CuO}}{1 \text{ mol CuO}} \times 79.5 = \boxed{132.8 \text{ g CuO}}$$



When 3.3 moles of Ni react with 159.3 grams of AgNO_3 , which is the limiting and which is the excess reactant?

$$\frac{159.3 \text{ g AgNO}_3}{137.8 \text{ g AgNO}_3} \times \frac{1 \text{ mol AgNO}_3}{1 \text{ mol AgNO}_3} \times \frac{1 \text{ mol Ag}}{1 \text{ mol AgNO}_3} = \boxed{1.15 \text{ mol Ag}}$$

$$\frac{3.3 \text{ mol Ni}}{1 \text{ mol Ni}} \times \frac{2 \text{ mol Ag}}{2 \text{ mol Ag}} = \boxed{6.6 \text{ mol Ag}}$$

$\text{AgNO}_3 = \text{Limiting}$
 $\text{Ni} = \text{Excess}$