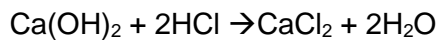
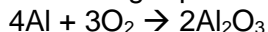


## Limiting Reactant Worksheet

1. Calcium hydroxide, used to neutralize acid spills, reacts with hydrochloric acid according to the following equation:



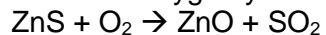
- a. If you have spilled 6.3 mol of HCl and put 2.8 mol of  $\text{Ca(OH)}_2$  on it, which substance is the limiting reactant?
- b. How many moles of the excess reactant remain?
2. Aluminum oxidizes according to the following equation:



- a. Powdered Al (0.048 mol) is placed into a container containing 0.030 mol  $\text{O}_2$ . What is limiting reactant?

- b. How many moles of the excess reactant remain?

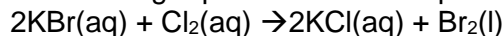
3. Heating zinc sulfide in the presence of oxygen yields the following:



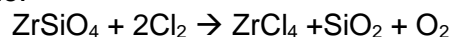
- a. If 1.72 mol of ZnS is heated in the presence of 3.04 mol of  $\text{O}_2$ , which is the limiting reactant? (Balance the equation first)

- b. How many moles of the excess reactant remain?

4. Chlorine can replace bromine in bromide compounds forming a chloride compound and elemental bromine. The following equation is an example of the reaction:



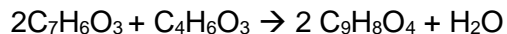
- a. When 0.855g of  $\text{Cl}_2$  and 3.205g of  $\text{KBr}$  are mixed in solution, which is the limiting reactant?
- b. How many grams of each product are formed?
5. A process by which zirconium metal can be produced from the mineral zirconium (IV) orthosilicate,  $\text{ZrSiO}_4$ , starts by reacting it with chlorine gas to form zirconium (IV) chloride.



What mass of  $\text{ZrCl}_4$  can be produced if 862g of  $\text{ZrSiO}_4$  and 950.g of  $\text{Cl}_2$  are available? (You must first determine limiting reactant).

6. In the reaction  $\text{BaCO}_3 + 2\text{HNO}_3 \rightarrow \text{Ba}(\text{NO}_3)_2 + \text{CO}_2 + \text{H}_2\text{O}$ , what mass of  $\text{Ba}(\text{NO}_3)_2$  can be formed by combining 55g  $\text{BaCO}_3$  and 26g  $\text{HNO}_3$ ?

7. Aspirin,  $\text{C}_9\text{H}_8\text{O}_4$ , is synthesized by the reaction of salicylic acid,  $\text{C}_7\text{H}_6\text{O}_3$ , with acetic anhydride,  $\text{C}_4\text{H}_6\text{O}_3$ .



- a. When 20.0 g of  $\text{C}_7\text{H}_6\text{O}_3$  and 20.0g of  $\text{C}_4\text{H}_6\text{O}_3$  react, which is the limiting reagent?

- b. What mass in grams of aspirin are formed?

