Stoichiometry

Solve each of the following stoichiometry problems on a separate sheet of paper.

1. $2 H_2(g) + O_2(g) \rightarrow 2 H_2O(l)$
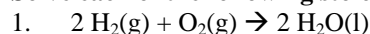
How many moles of O_2 are required to produce 0.60 moles of H_2O?

2. $Al_2(SO_4)_3(aq) + 3 BaCl_2(aq) \rightarrow 2 AlCl_3(aq) + 3 BaSO_4(s)$
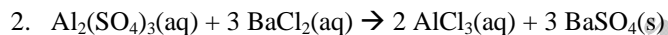
How many grams of barium chloride will react with 18.0 moles of aluminum sulfate?

3. $2 KOH(aq) + H_2SO_4(aq) \rightarrow K_2SO_4(aq) + 2 HOH(l)$
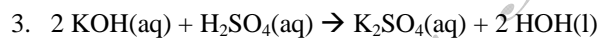
Potassium hydroxide reacts with hydrogen sulfate in a double replacement reaction. What is the mass of potassium sulfate produced if 19.6 g of KOH reacts with excess hydrogen sulfate?
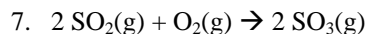
4. $2 CuO(s) \rightarrow 2 Cu(s) + O_2(g)$
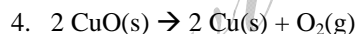
Copper(II) oxide decomposes to form solid copper and oxygen gas. If 95.4 g of copper(II) oxide decomposes, how many grams of oxygen are formed?

5. $N_2(g) + 3 H_2(g) \rightarrow 2 NH_3(g)$
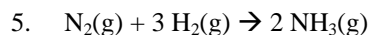
What volume of hydrogen, reacting with nitrogen, will produce 500. mL of NH_3 at STP?
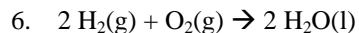
6. $2 H_2(g) + O_2(g) \rightarrow 2 H_2O(l)$
How many liters of oxygen gas are needed to produce 2.0 kilograms of water at STP?

7. $2 SO_2(g) + O_2(g) \rightarrow 2 SO_3(g)$
How many liters of oxygen would react with 2.20×10^{20} molecules of SO_2 at STP?

8. $2 Na + Cl_2 \rightarrow 2 NaCl$
You are given 18.5 moles of sodium; calculate the number of moles of sodium chloride produced.
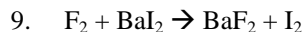
9. $F_2 + BaI_2 \rightarrow BaF_2 + I_2$
How many moles of barium fluoride can be produced from 88.3 grams of barium iodide?
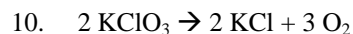
10. $2 KClO_3 \rightarrow 2 KCl + 3 O_2$
Calculate the mass of potassium chloride that is produced as 12.4 grams of potassium chlorate decomposes.
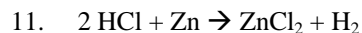
11. $2 HCl + Zn \rightarrow ZnCl_2 + H_2$
Calculate the mass of zinc needed to fully react with the 124.9 grams of hydrogen chloride.

12. $Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$
What mass of aluminum must be used to produce 15.0 g iron?
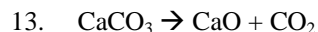
13. $CaCO_3 \rightarrow CaO + CO_2$
How many liters of carbon dioxide will be produced in the decomposition of 220. grams of calcium carbonate at STP?