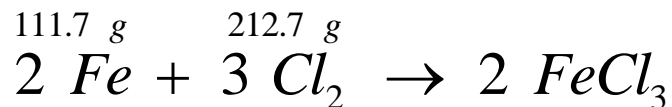


STOICHIOMETRY WORKSHEET 2, MASS TO MASS, & MOLARITY EQUATIONS.

1. When 111.7 grams of iron and 212.7 grams of chlorine gas completely react, iron(III)chloride, $FeCl_3$, is formed.
 a. **Write the balanced equation** for the reaction.



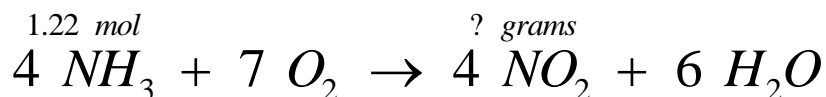
- b. Calculate the number of moles of each reactant (two separate equations).

$$\frac{111.7 \text{ g Fe}}{55.85 \text{ g}} \times \frac{1 \text{ mol Fe}}{1} = 2 \text{ mol Fe} \quad ; \quad \frac{212.7 \text{ g Cl}_2}{70.9 \text{ g}} \times \frac{1 \text{ mol Cl}_2}{1} = 3 \text{ mol Cl}_2$$

- c. Calculate the moles of the product that are formed (two separate equations).

$$\frac{2 \text{ mol Fe}}{2 \text{ mol Fe}} \times \frac{2 \text{ mol FeCl}_3}{2 \text{ mol Fe}} = 2 \text{ mol FeCl}_3 \quad ; \quad \frac{3 \text{ mol Cl}_2}{3 \text{ mol Cl}_2} \times \frac{2 \text{ mol FeCl}_3}{3 \text{ mol Cl}_2} = 2 \text{ mol FeCl}_3$$

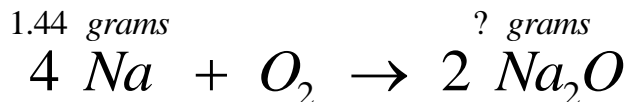
2. Calculate the number of grams of potassium chloride that will be formed by the decomposition of 6.45 grams of potassium chlorate, $KClO_3$.
3. Calculate the number of grams of nitrogen dioxide gas formed when 1.22 moles of ammonia, NH_3 , react with oxygen gas to produce nitrogen dioxide gas and water.



$$\frac{1.22 \text{ mol NH}_3}{4 \text{ mol NH}_3} \times \frac{4 \text{ mol NO}_2}{4 \text{ mol NH}_3} \times \frac{46.01 \text{ g}}{1 \text{ mol NO}_2} = 56.1 \text{ g NO}_2$$

4. For this reaction, answer the below questions: $Zn + 2 HCl \rightarrow ZnCl_2 + H_2$
 a. **How many moles of hydrogen chloride** are needed to completely react with 12.35 grams of zinc?
 b. **What volume of 3.00 M hydrochloric acid** is required to react with 12.35 grams of zinc?

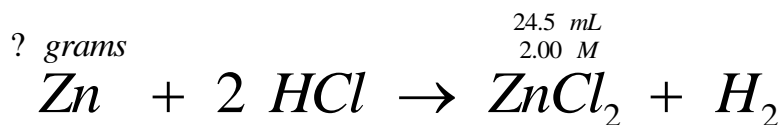
5. **What mass of sodium oxide** is produced by the reaction of 1.44 grams of sodium with oxygen?



$$\frac{1.44 \text{ g Na}}{22.99 \text{ g}} \times \frac{1 \text{ mol Na}}{1 \text{ mol Na}} \times \frac{2 \text{ mol Na}_2\text{O}}{4 \text{ mol Na}} \times \frac{61.98 \text{ g}}{1 \text{ mol Na}_2\text{O}} = 1.94 \text{ g Na}_2\text{O}$$

6. **How many moles of lead(II)nitrate** will be needed to react with sodium chromate to produce 4.62 kg of lead(II)chromate?

7. **How many grams of zinc** metal will react with 24.5 mL of 2.00 M hydrochloric acid, HCl, forming zinc chloride?



$$\frac{24.5 \text{ mL HCl}}{1000 \text{ mL}} \times \frac{1 \text{ L}}{1 \text{ L}} \times \frac{2.0 \text{ mol HCl}}{1 \text{ L}} \times \frac{1 \text{ mol Zn}}{2 \text{ mol HCl}} \times \frac{65.38 \text{ g}}{1 \text{ mol Zn}} = 1.60 \text{ g Zn}$$

8. For this reaction, answer the following questions: $\text{Cu} + 2 \text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2 \text{Ag}$

a. **How many grams of copper** are required to displace 9.35 grams of silver from the solution of silver nitrate?

b. If 5.50 grams of silver are produced in the above reaction, **how many moles of copper** were reacted?