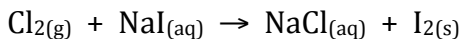


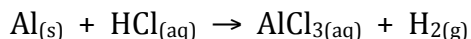
## Limiting Reactant Practice Problems

- 1) The more reactive halogen elements are able to replace the less reactive halogens from their compounds.

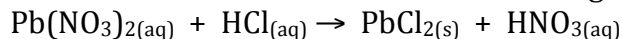


Suppose that a solution containing 25.0 g NaI reacts with 5.00 g of Cl<sub>2</sub>. What mass of iodine will be produced from the reaction above?

- 2) For the following ***unbalanced*** chemical reaction, suppose that exactly 15.0g of each reactant is used. What is the limiting reactant?



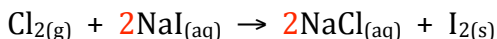
- 3) For the following ***unbalanced*** chemical reaction, suppose that exactly 15.0g of each reactant is used. What is the limiting reactant?



- 4) How much excess reactant (from question #3) will be left when the reaction is complete?

## Limiting Reactant Practice Problems

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Suppose that a solution containing 25.0 g NaI reacts with 5.00 g of  $\text{Cl}_2$ . What mass of iodine will be produced from the reaction above?

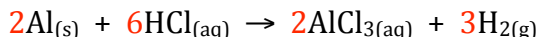
First, determine limiting reactant;

$$\frac{5.00\text{gCl}_2}{1} \times \frac{1\text{molCl}_2}{71\text{gCl}_2} \times \frac{2\text{molNaI}}{1\text{molCl}_2} \times \frac{150\text{gNaI}}{1\text{molNaI}} = 21.1\text{gNaI, we have excess}$$

NaI available, so the  $\text{Cl}_2$  is the limiting reactant and should be used to calculate the amount of  $\text{I}_2$  produced in this reaction.

$$\frac{5.00\text{gCl}_2}{1} \times \frac{1\text{molCl}_2}{71\text{gCl}_2} \times \frac{1\text{molI}_2}{1\text{molCl}_2} \times \frac{254\text{gI}_2}{1\text{molI}_2} = 17.9\text{gI}_2$$

- 2) For the following **unbalanced** chemical reaction, suppose that exactly 15.0g of each reactant is used. What is the limiting reactant?

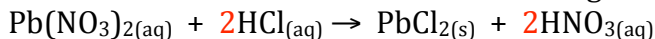


Start with either reactant and solve for the mass of the other reactant;

$$\frac{15.0\text{gAl}}{1} \times \frac{1\text{molAl}}{27\text{gAl}} \times \frac{6\text{molHCl}}{2\text{molAl}} \times \frac{36\text{gHCl}}{1\text{molHCl}} = 60.0\text{gHCl, we do not have 60.0g of}$$

HCl available (only 15 g HCl) to react with all of the Al, so HCl is the limiting reactant.

- 3) For the following **unbalanced** chemical reaction, suppose that exactly 15.0g of each reactant is used. What is the limiting reactant?



$$\frac{15.0\text{gPb}(\text{NO}_3)_2}{1} \times \frac{1\text{molPb}(\text{NO}_3)_2}{331\text{gPb}(\text{NO}_3)_2} \times \frac{2\text{molHCl}}{1\text{molPb}(\text{NO}_3)_2} \times \frac{36\text{gHCl}}{1\text{molHCl}} = 3.26\text{gHCl, we}$$

have plenty of HCl to react with all 15g of the  $\text{Pb}(\text{NO}_3)_2$ , so  $\text{Pb}(\text{NO}_3)_2$  is the limiting reactant.

- 4) How much excess reactant (from question #3) will be left when the reaction is complete?

Subtract the amount of HCl that would react (3.26g HCl) and subtract it from the starting amount of HCl (15.0g);

$$15.0\text{g} - 3.26\text{g} = 11.74\text{g HCl excess}$$