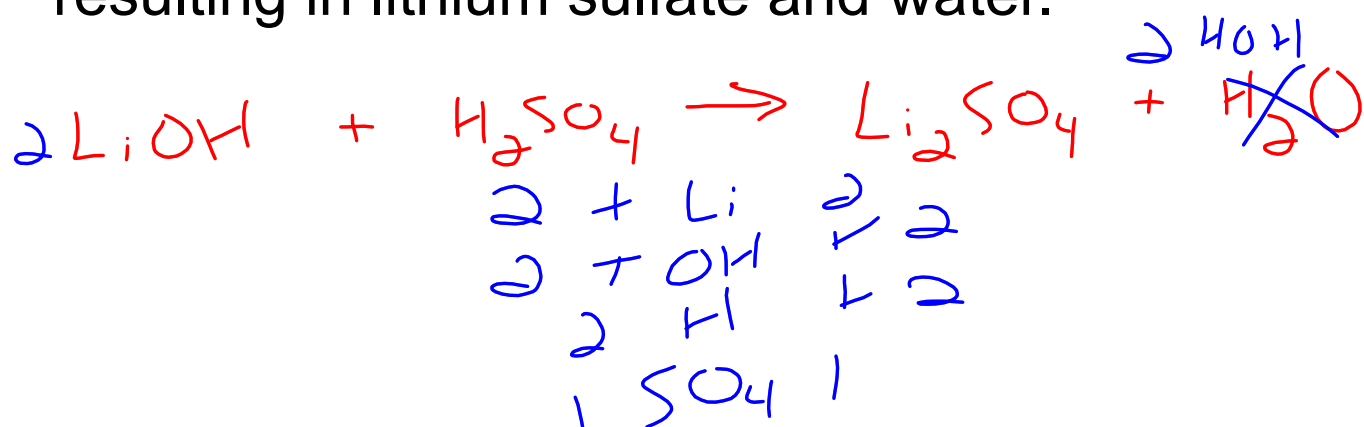


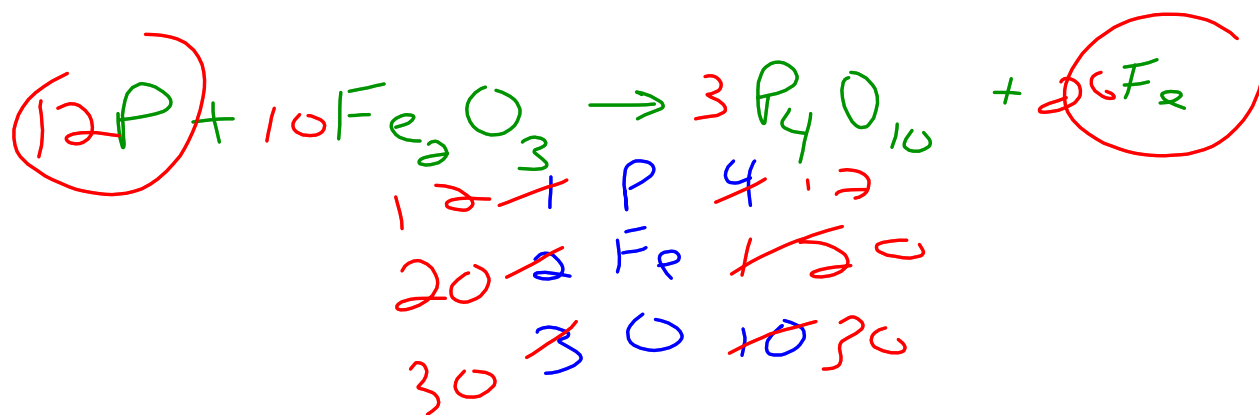
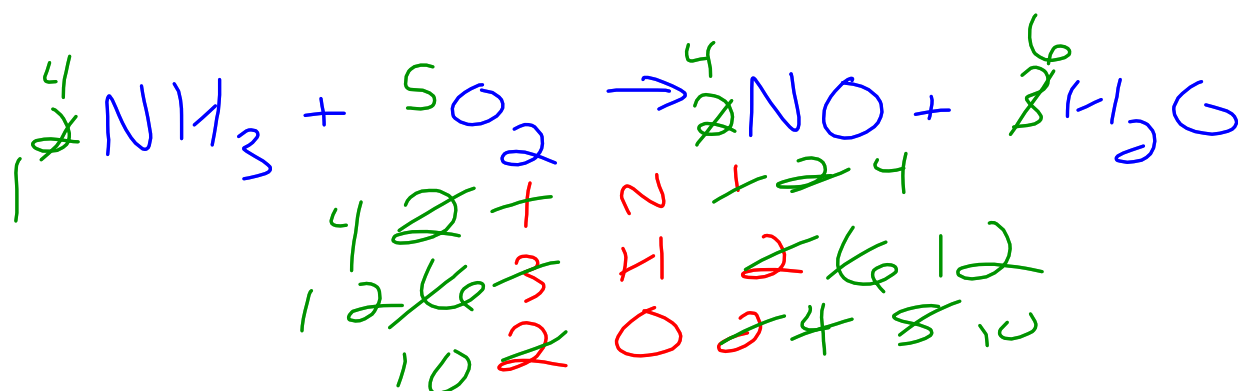
Warm up

Write and balance the following equation

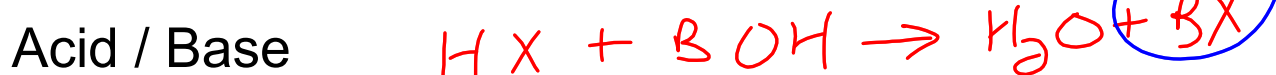
Lithium hydroxide is added to sulfuric acid resulting in lithium sulfate and water.



Homework Questions:



Common Types of Reactions



Limiting Reagent

This is the reactant that runs out first, thus stopping the reaction.

*it is important to note that the reactant with the least mass is NOT always the limiting reagent

To determine limiting reagents, set up a ratio to see how much you need of A to react with B.

Then ask yourself the following -

is there exactly enough A for B?

is there too much A for B?

is there not enough A for B?

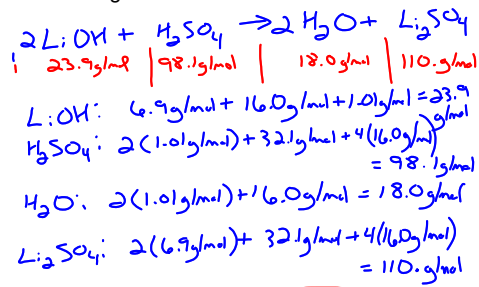
The limiting reagent is used to determine EVERY thing in the reaction.

All ratios should be done in mols, not grams.
All laboratory answers should be recorded in grams.

You will do lots of mol to gram and gram to mol calculations

Example stoichiometry

Given 132.4 g of lithium hydroxide and 203.2 g of sulfuric acid, determine the limiting reagent, the mass of the products, and the mass of the remaining reactant.



$$\frac{132.4\text{g LiOH}}{23.9\text{g}} = \frac{\text{mol}}{23.9\text{g}} = \boxed{5.54\text{mol LiOH given}}$$

$$\frac{203.2\text{g H}_2\text{SO}_4}{98.1\text{g}} = \frac{\text{mol}}{98.1\text{g}} = \boxed{2.07\text{mol H}_2\text{SO}_4 \text{ given}}$$

Determine Limiting Reagent

$$\frac{\text{LiOH}}{\text{H}_2\text{SO}_4} = \frac{\text{coeff. } 2}{1} = \frac{\text{actual } 5.54\text{mol}}{X}$$

$2X = 5.54\text{mol}$
 $X = 2.77\text{mol H}_2\text{SO}_4 \text{ needed}$

LR

$$\frac{\text{H}_2\text{SO}_4}{\text{H}_2\text{O}} = \frac{1}{2} = \frac{2.07\text{mol}}{X}$$

$\rightarrow 4.14\text{mol H}_2\text{O} \text{ formed}$

$$\frac{\text{H}_2\text{SO}_4}{\text{Li}_2\text{SO}_4} = \frac{1}{1} = \frac{2.07\text{mol}}{X}$$

$\rightarrow 2.07\text{mol Li}_2\text{SO}_4 \text{ formed}$

$$\frac{\text{H}_2\text{SO}_4}{\text{LiOH}} = \frac{1}{2} = \frac{2.07\text{mol}}{X}$$

$\rightarrow 4.14\text{mol LiOH} \text{ used}$

$$\text{given} - \text{used} = \text{remaining}$$

$$5.54\text{mol} - 4.14\text{mol} = \boxed{1.40\text{mol LiOH remaining}}$$

Final Results

$$\frac{1.40\text{mol LiOH}}{\text{mol}} \times 23.9\text{g} = 33.5\text{g LiOH}$$

$$\frac{2.07\text{mol Li}_2\text{SO}_4}{\text{mol}} \times 110.9\text{g} = 228\text{g Li}_2\text{SO}_4$$

$$\frac{4.14\text{mol H}_2\text{O}}{\text{mol}} \times 18.0\text{g} = 74.5\text{g H}_2\text{O}$$

What is the limiting reagent if 125 g of sodium phosphate reacts with 95.0 g of calcium chloride?

What is the limiting reagent when 3.45 g of carbon tetrafluoride reacts with 12.1 g of bromine?

