Review Day

- Get your final mass of PbI from Mr. Breish.

- Make sure to subtract the mass of the filter paper and finish the lab questions.

- Review of Stoichiometry to follow.

Actual Yield

- Determine the mass of the precipitate

- Convert to moles

- How does this compare to your theoretical yield?

- Determine the % yield:

  - (actual/theoretical)x100%

Excess Reagent

- Based on the mole ratio, how many moles of PbI do you have left in solution?

Review Day

- Brief discussion/modeling of molar ratios.

- A word about limiting, excess, and unlimited reactants.

- Transcribing from words to chemical equations.

- Basic Stoichiometry review

Disclaimers

- Email me by 8:00pm tonight with questions. I will check email between 8:00 and 8:30. bbreish@cbsd.org

- Check the website for links to helpful videos and the slide presentations from the week.

- I will be here after school today for any questions until 3:30.

Molar Ratios

- Until now: multiple (4) steps to solving stoichiometric equations.

- If we use DA to do molar ratios it may be more helpful.

- You still need a balanced equation first.

How many grams of HNO_3 form when 5g of N_2O_5 are used in the following reaction?

$$N_2O_5 + H_2O \longrightarrow HNO_3$$

• Limiting, Excess, and Unlimited Reactants

- We have seen problems with excess reactants. I will point them out as we go over them.

- Limiting reactants: do the conversion with molar ratio. If the answer is more than what is available, it is the limiting reactant.

Excess Reactant

- Excess reactants: do the conversion with molar ratio. If the answer is less than what is available, it is the excess reactant.

7g of O_2 combine with 2g of H_2 to form water. Determine the excess and limiting reactant

- Write a balanced equation.

- See how many moles of H_2 would combine with 7g of O_2. Is there enough?

Words to Chemical Equations

- Use your **periodic table to ions** to define the elements or polyatomic ions in a reaction.

- Use the same table to determine the charges on each piece of a compound.

- Balance the charges using subscripts.

- Balance the equation.

Calcium Carbonate and Lithium Sulfate combine in a double replacement reaction.

Propane C_3H_8 burns in oxygen to form water and carbon dioxide.
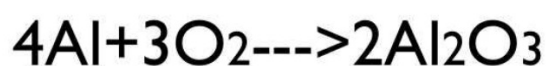
Good Morning!

Please grab a whiteboard.

Write the procedure for setting up a stoichiometry problem.

What information should you gather before starting a problem?

Stoichiometry Review

- Balance the equation & Ref Eqns

Known
1

- Convert <u>known</u> to moles

- Molar ratio based on balanced equation. Coeffien st
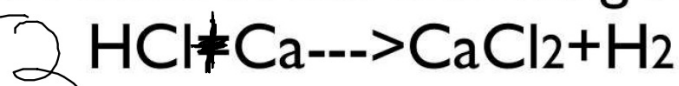
- Convert to units of <u>unknown</u>

4Al+3O₂--->2Al₂O₃
If 2.5g of aluminum oxide are formed, how many moles of oxygen initially reacted?

$$\frac{2.5g\ Al_2O_3}{1} \times \frac{1\ mol\ Al_2O_3}{102g\ Al_2O_3} \times \frac{3\ mol\ O_2}{2\ mol\ Al_2O_3} = 0.037\ mol\ O_2$$

Aluminum Nitrate and Sodium Chloride combine in a double replacement reaction.

How many grams of hydrogen will form if 10.0 g of Ca reacts in the following reaction:

$$2\ HCl + Ca ---> CaCl_2 + H_2$$

$$\frac{10g\ Ca}{1} \times \frac{1\ mol\ Ca}{40g\ Ca} \times \frac{1\ mol\ H_2}{1\ mol\ Ca} \times \frac{2g\ H_2}{1\ mol\ H_2} = 0.5g\ H_2$$

We will be kahooting in a moment. Write down all of the relevant information about a reaction where hydrogen gas and oxygen gas make water.

Excess and limiting reactants:

Perform the 4 step stoichiometry conversion for the reactants.

Whichever produces the **smaller** amount of the product is your limiting reactant. That is your **theoretical** yield.

If I start with 25.0 grams of lead (II) nitrate and 15.0 grams of sodium iodide, how many grams of sodium nitrate can be formed?

Known (circled, red, top) ~ 25.0 grams of lead (II) nitrate

Known (circled, blue) ~ 15.0 grams of sodium iodide

Unknown (circled, green) ~ how many grams of sodium nitrate

$7.8g$ % Yield $= 91.8\%$

Balanced Equation:

$$Pb(NO_3)_2 + 2NaI \longrightarrow 2NaNO_3 + PbI_2$$

Reference Equations:

$Pb(NO_3)_2$: $1 \, mol = 6.02 \times 10^{23} \, part = 331 \, g \Rightarrow 12.8g$

NaI: $1 \, mol = 6.02 \times 10^{23} \, part = 150 \, g$

$NaNO_3$: $1 \, mol = 6.02 \times 10^{23} \, part = 85 \, g$

$8.5 \, g$

Mg + 2HCl → MgCl$_2$ + H$_2$
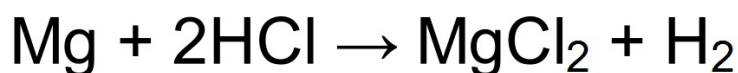
What volume of hydrogen at STP is produced from the reaction of 50.0 g of Mg and the equivalent of 75 g of HCl?

K: 50g Mg & 75g HCl

U: ___ L H2

LR = HCl

Theoretical Yield = 23 L

Worksheet.

Answers are posted on school wires

"Stoichiometry review with answers"