CHMG.141.02

With Dr. Bailey

**Recitation W15**

**Stoichiometry/Review**

**Part A**

Zinc reacts with acids to produce H2 gas.

Have 10.0 g of Zn

**Zn(s) + 2 HCl(aq) --> ZnCl2(aq) + H2(g)**

1. What is the theoretical yield (g) of H2 gas?
2. How many liters of H2 at 1.15 atm and 30.0 °C produced by reaction of 10.0 g Zn?
3. How many liters of H2 at STP produced by reaction of 10.0 g Zn?
4. What volume of 2.50 M HCl is needed to convert the Zn completely?

Zn(s) + 2 HCl(aq) --> ZnCl2(aq) + H2(g)

10.0g 2.50M

V = ?

1. What molarity of ZnCl2 formed?
2. How many molecules of HCl participate in the reaction? How many Cl atoms?
3. Zn(s) + 2 HCl(aq) --> ZnCl2(aq) + H2(g) ΔH = - 125 kJ

* Is this reaction exothermic or endothermic?
* Calculate the amount of heat transferred when 10.0 g of solid zinc reacts?

**Part B**

Titration of 20.0 mL of an unknown sulfuric acid acid solution required

18.45 mL of 0.100 M NaOH to reach equivalence.

1. Write the balanced equation.
2. What is the concentration of the sulfuric acid?
3. Calculate the pH of the sulfuric acid solution.

**Part C**

1. 10.00 of hydrogen and 10.00 of oxygen mixed in the previously evacuated 500 mL flask at 500 K. After the reaction has reached completion, what would be the pressure in the flask?
2. Write the balanced equation.
3. What is the theoretical yield of water (in moles, in g)? Tip: this is limiting reactants problem
4. Build the table:

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of moles** | **H2** | **O2** | **H2O** |
| Initial |  |  |  |
| Change |  |  |  |
| After the reaction has reached completion |  |  |  |

1. What total moles of gas is at completion?
2. What would be the pressure in the flask?