Name _____ Partner _____
Lab Section M Tu W Th F

Chemistry 130
Experiment 4: Stoichiometry

Our experiment this week will have three parts. In the first part we will look at some data of compounds and some calculations involving the data. In part two we will continue to look at the experiment you did last week. And in part three we will investigate mass changes in relationship with a chemical reaction.

Part 1:

A. Name the following compounds and indicate whether each is covalent or ionic:

1. N_2
2. $CaCl_2$
3. AlF_3
4. CCl_4
5. Na_2SO_4
6. $Mg(OH)_2$
7. SO_3

B. Calculate the molecular weight (or formula weight) for each of the following:

1. N_2
2. $CaCl_2$
3. AlF_3
4. CCl_4
5. Na_2SO_4
6. $Mg(OH)_2$
7. SO_3

C. Calculate the number of moles for 1.65 g of each of the following:

1. N_2
2. $CaCl_2$
3. AlF_3
4. CCl_4
5. Na_2SO_4
6. $Mg(OH)_2$
7. SO_3

Part 2:

Last week (in Procedure 4) you placed a zinc strip into a hydrochloric acid solution and noted that gas bubbles almost immediately began to form. You also noted a weight loss for the zinc strip.

What mass of zinc was lost? Initial weight of zinc strip _____ g.

Final weight of zinc strip _____ g.

Mass of zinc lost = _____ g.

How many moles of zinc were lost? [Atomic mass of zinc = 65.39]

Write a balanced equation for the Procedure 4 experiment that you did last week:

_____

How many moles of hydrogen gas were formed in your experiment?

_____

Part 3:

A. Place 5 mL of 1.0 M. aqueous calcium chloride solution in one of the available test tubes. Place 5 mL of 1.0 M. aqueous sodium carbonate solution in one of the available test tubes. Place both test tubes (with their contents) into a small beaker. Weigh the entire assembly.

Weight of beaker, test tubes, and solutions _____ g.

Now CAREFULLY mix the two solutions by adding the Na_2CO_3 solution to the $CaCl_2$ solution. Be sure that you do not spill and / or lose any liquid during the mixing process!
Record your observations (was there a temperature change?)::

Reweigh the entire assembly. Use the same balance.

Weight of beaker, test tubes, and solutions _____ g.
(after mixing)

Was any weight gained or lost? The Law of Conservation of Mass indicates that the mass of the reactants must equal the mass of the products. Any comment:

Write a balanced reaction equation for the reaction:

_____

When an ionic solid "dissolves" in water, the ions actually become separated and surrounded by water molecules. So solid sodium chloride is $NaCl_{(s)}$, where the "s" represents "solid." But upon mixing solid sodium chloride with water the solid dissolves and becomes discrete Na^+ ions and Cl^- ions and we represent these dissolved ions as $Na^+_{(aq)}$ and $Cl^-_{(aq)}$, where the "aq" indicates the ion dissolved in water. In some reactions *all* of the ions present in the reactants are not involved in the reaction, but rather only *some* of the ions react. Ions that are not involved in the reaction are called *spectator ions* (that is, they watch other stuff react). When one writes a reaction equation *only involving those ions which react*, we call that reaction a *net ionic equation*. This equation, of course, does not involve the spectator ions that must also be present.

Write a balanced *net ionic equation* for the reaction:

_____

B. Discard (correctly) the contents of the test tubes from part A above. Rinse out the tubes and

DRY the outside carefully, then proceed:

Place 2 mL of 3.0 M. hydrochloric acid solution in one of the available test tubes.
Place 2 mL of 1.0 M. aqueous sodium carbonate solution in one of the available test tubes.
Place both test tubes (with their contents) into a small beaker. Weigh the entire assembly.

Weight of beaker, test tubes, and solutions _____ g.

Now CAREFULLY mix the two solutions by SLOWLY adding the hydrochloric acid solution to the Na_2CO_3 solution. Be sure that you do not spill and / or lose any liquid during the mixing process! Record your observations (was there a temperature change?):

After any reaction has subsided, reweigh the entire assembly. Use the same balance.

Weight of beaker, test tubes, and solutions _____ g.
(after mixing)

Was any weight gained or lost? The Law of Conservation of Mass indicates that the mass of the reactants must equal the mass of the products. Any comment:

Write a balanced reaction equation for the reaction:

_____

Write a balanced *net ionic equation* for the reaction:

_____

What is the name of the gas which was formed? _____

What is the formula for this gas? _____

What is the molecular weight for this gas? _____

How many moles of this gas were formed in this reaction?