

## Chemistry 140

Please have the following pages ready **before** class on Monday, February 11. Note that the different parts will be standard divisions in **all** lab writeups. For this particular writeup, there is no abstract. The copied pages of the write-up is due in class on **Tuesday, February 19**.

This is a **discovery**-type of lab. And this is what your lab notebook should look like:

Your name, your partner's name, date of experiment

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### Lab 4: Types of reactions

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#### Part 1. Purpose

Write a one- or two-sentence purpose for the main goal of this experiment.

Then, under that, copy the following:

“Other skills:

- Making and recording relevant physical observations
- Classifying raw data into appropriate types”

Then, leave the rest of the first page blank. You will write and **balance** the eight chemical equations in this experiment in this space.

#### Part 2. Materials and methods

**Equipment:** Review the procedure and develop a list of equipment. My list had at least six items. Hint: there are some *implied* pieces of equipment; for instance, when the procedure tells you to burn something, what equipment do you need?

**Chemicals:** Review the procedure and develop a list of chemicals. My list had at least ten chemicals.

#### Part 3. Procedure

I copied this procedure directly from one of Jackie Hong's labs. One courtesy note: please cap all solutions that are not being used.

\* If concentration given in the lab is different than given in the procedure, make the correction and go on.

\*If there is no immediate evidence of a reaction, add more reactants and/or wait longer. It may be a “no reaction”.

- (1) Clean Mg strip with glass wool and burn it while holding it with tongs. Put the product in the solid waste container.
- (2) Open the bottle of conc.  $\text{NH}_4\text{OH}$ . Test the pH of the fume using a wet pH paper.  
\*water is not a reactant.
- (3) Place Mg strip in 0.1M HCl solution.
- (4) Mix 0.1M HCl solution with 0.1M  $\text{AgNO}_3$  solution in equal volume.
- (5) Measure pH of 0.1M HCl and 0.1M NaOH. Mix two in equal volume, mix well and measure pH.
- (6) Place  $\text{CaCO}_3$  (s) in 0.1M HCl solution.  
\* It does a chain reaction.
- (7) Place Cu (s) in 0.1M  $\text{ZnSO}_4$  solution.  
\*See the relationship between (7) and (8).
- (8) Place Zn(s) in 0.1M  $\text{CuSO}_4$  solution.

**Waste disposal** — All solids (including metal bits) and used pH paper should be placed in the solid waste beaker in the fume hood. All used and extra solution should be placed in the liquid waste container.

#### Part 4. Original data

Make a table of observations:

Reaction #	Reactants	Observations
1	Mg (s) and ?	<p>Describe the color and state of the reactants before the reaction.</p> <p>Describe any changes (color, gas, etc.) you see during the reaction. Also note how long the reaction took to get started and to finish.</p> <p>If no reaction occurs, state what you did to check that there was no reaction.</p> <p>Describe the color and state of the reaction products.</p>

You will need eight rows in your table. Note that this is a case where each row should be at least a third of a page tall.

#### Parts 5 and 6. Calculated and group results

None.

#### Part 7. Analysis

- Make the simple table below:

Reaction	Unbalanced chemical equation	Classification
1		
2		
3		
4		
5		
6		
7		
8		

Under "classification", choose an entry from the following list:

"precipitation", "acid-base", "oxidation-reduction (redox)" (these are the terms from Chapter 4 of Silberberg)

Also under classification, choose an appropriate entry from the following list (not all reactions will require this and some may require two off this list):

"double replacement (metathesis)", "single replacement", "composition (addition)", "decomposition", "combustion".

- Under the "Purpose" section on the first page, write the **equation** for the reaction, or in the case of an ionic reaction, write the **net ionic equation** for that reaction. Write the equations in numerical order. Reaction 6 requires *two* chemical equations.

## Part 8. Conclusion

In paragraph format, state the signs you saw that a chemical reaction was happening.

State any correlations between certain signs of a chemical reaction and the type of reaction it was. For instance, if a gas was evolved, was that an indication of a combustion reaction?

## Abstract

None is required for this lab writeup.