GUIDE TO PREPARING LAB REPORT

- ❖ In order to receive credit for the experiments performed in this class, you must complete and turn in a lab report as described below.
- ❖ The due dates for lab reports will be communicated to you by your lab instructor.
- ❖ Turning in a late lab report could be subject to a late penalty or not acceptable based on discretion of your lab instructor.

Lab report for each experiment should contain the following:

- A completed Report Form (available on profpaz website).
- Report form should be completed neatly in ink, without excessive corrections.
- Observations should be summarized based on your lab notebook, in a coherent and clear manner, utilizing proper scientific concepts learned in lecture and lab.
- If calculations are required, they should include appropriate equation, substitution and answers with proper units and significant figures.
- Conclusion or questions should be completed in a coherent manner based on results observed and obtained in the experiment
- Some examples of notebooks pages that include the above criteria are provided on the following pages.

Example 1

TITLE	LAB 2	BOOK No.	1	DATE	9/17/09	30
NAME	CHAD LANDRIE	PROJECT No.	X	FROM PAGE No.	FIRST PAGE	

PRE-LAB

TITLE: LAB 2 - Chemical Proportionality: Carbonate and Hydrochloric Acid

INTRODUCTION:

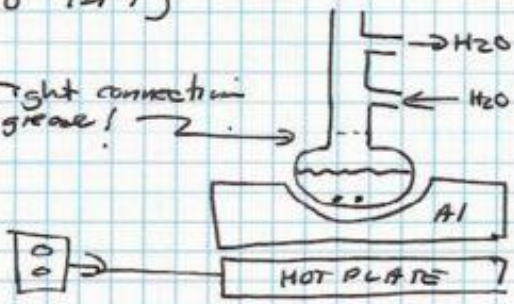
A solution of hydrochloric acid (HCl) in water can be neutralized by adding a weak base such as Na_2CO_3 (Na_2CO_3). The products of this reaction are sodium chloride (NaCl), carbon dioxide (CO_2) and water (H_2O). The reaction is complete (All HCl has reacted) when the evolution of CO_2 gas (seen as bubbles) ceases. In Part I of this experiment we will compare observations made when Na_2CO_3 is added to a solution of HCl(aq) and when it is added to pure water. Since water is not a strong acid (neutral), I hypothesize that no reaction will take place when Na_2CO_3 is added to pure H_2O and therefore no CO_2 gas (seen as bubbles) will be seen. In part II we will determine what mass of Na_2CO_3 is required to neutralize various volumes of HCl solution at 3 different concentrations. By determining the number of moles of Na_2CO_3 that are required to neutralize each number of moles of HCl, we can determine the ratio of chemical proportionality. Since we already have the balanced equation, we are able to predict that the ratio will be 2:1 moles HCl to moles Na_2CO_3. Finally, in part IV, we will use the same procedure to identify the concentration of an unknown sample of HCl solution.

→

SIGNATURE	DATE	WITNESSED BY	DATE
Chad Landrie	9/17/09	X	X

PUT THE BACK COVER UNDER THE COPY PAGE BEFORE WRITING

(5) Heat w/ sand bath or Al block (Turn on H_2O 1st!)



Make sure pieces fit together properly first; practice assembly B4 adding reagents

Tight connection + grease!

used Al block, as per instructor's info

(6) Heat to 120-130° : let soln boil for 15 minutes (PREP AB – let heat to boil : may not need to monitor T°)

boil start : 7:47 pm
boil end : 8:03 pm

(7) Remove from heat; allow to cool to RT OK to cool in water bath

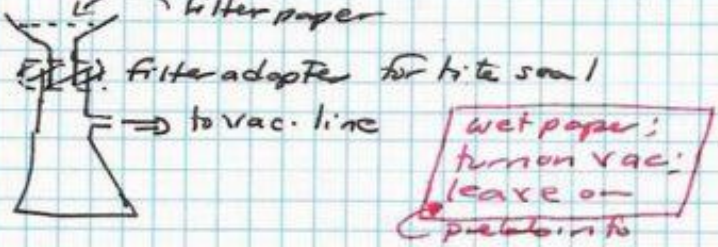
(8) Remove condenser; set flask in 50 mL beaker

(9) Add 3M H_2SO_4 in ~0.5-mL increments until set heavy white ppt that remains w/ mixing : then add addn 0.5 mL (should take 2-3 mL total)

V_{used} = 2.5 mL

(10) Cool in ice bath (beaker w/ ice)

(11) Vacuum filtration w/ Hirsch funnel



wet paper; turn on vac; leave on (pre-label info)

(12) Transfer solid to weighing paper then to 10-mL Erlenmeyer flask
Weigh crude! Save a bit!

weight = 0.182 g

(13) Recrystallization: add 2 mL H_2O + boiling stick or stone : heat to boil on hot plate. Add H_2O in 0.5-mL increments until all dissolves : Then add 0.5 mL more H_2O. Note antisolvent

$V_{H_2O\ used}$: 4.5 mL (but some evap)

(14) Let cool to RT on bench top; then cool in ice/water bath 5 minutes

many crystals! (14)

(15) Collect crystals by vac. filtration
fresh filter paper
(16) Rinse w/ cold H_2O; then pull air thru for a few minutes
(17) Put on watch glass or paper + leave to dry
watchglass or beaker ok; place in hood
(18) Once dry: weigh, determine melting point ★ obtain IR spectrum, NMR

crystals are white and in the form of beautiful long needles

mass: 0.162 g

mp: 156-159°C

★ melting point (instructor will demo no needed)
(a) place in capillary tube w/ one open end
(b) put tube in melting apparatus + heat slowly
(c) Note T° Range of melting

RESULTS

Calculations

limiting reagent is methyl salicylate ~~salicylic acid~~

$$\text{theor yield} = 0.235\text{g MS} \times \frac{1\text{mole MS}}{152\text{g MS}} \times \frac{1\text{mole SA}}{1\text{mole MS}} \times \frac{138\text{g}}{1\text{mole SA}}$$

$$= 0.213\text{g}$$

$$\%\text{ yield} = \frac{0.162\text{g}}{0.213\text{g}} 100 = 76.1\%$$

this should all be purple since it was done during or after the lab

NMR Results

Methyl salicylate has 8 unique carbons and thus 8 peaks in its NMR spectrum. Salicylic acid has lost one of these carbons (the OCH_3) so it has 7 carbons and 7 peaks. The peak at δ 52 ppm for the OCH_3 is gone in the spectrum of salicylic acid

CONCLUSION

attached to Lab Report sheet

↑ you may paste this in your lab notebook later, after you get the report back, along w/ the Report sheet itself (OK to paste on backs of pages) (15)

Example 2

This example combines the Procedure and Data & Observations into one section and shows the difference between initial observations made in the lab and summarizing of the results in the Report Form.

HYDRATED CRYSTALS

Purpose:

This experiment explores the physical and chemical properties of hydrated crystals.

Procedure/Data & Observation

Heat small sample of copper sulfate crystals	• Crystals appear blueish before heating • After heating for 5 min crystals become white on the outside • After heating for 10 min longer crystals become all white
Place some crystals in test tube and add water	• After adding water, crystals become blue again • Crystals do not dissolve in water

Results:

Before heating, copper sulfate crystals appeared blue in color. After heating, crystals began losing color and become progressively whitish in color. This process began quicker on the surface of the crystals, till eventually all the crystals become white in color after 15 minutes. The dried crystals were placed in a test tube and water drops added to them. After adding water, the crystals regained their blueish color but did not dissolve in water.