

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

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⑤ Heat w/ sand bath or Al blocks (turn on H₂O 1st!)

used Al blocks, as per instructions in fo

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

Tight connection + grease!

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

⑥ Heat to 120-130°; let soln boil for 15 minutes (PREPARE - let heat to boil; may not need thermometer!)

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 H₂SO₄ 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)

Used = 2.5 mL

⑩ cool in ice bath (beaker w/ ice)

⑪ Vacuum filtration w/ Hirsch funnel / filter paper

Filter paper
Filter adapter for 125 mL
to vac. line

wet paper; turn on vac; leave on

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

weight = 0.182g

⑬ Recrystallization: add 2 mL H₂O + boiling stick or stone; heat to boil on hot plate. Add H₂O in 0.5-mL increments until all dissolves; then add 0.5 mL more H₂O. Note ant solvent

V H₂O 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 H₂O; then pull air thru for a few minutes
- (17) Put on watch glass or paper + leave to dry
 watch glass or beaker OK; place in hood
- (18) Once dry: weigh
 determine melting point
 obtain IR spectrum
 NMR
- * melting point (instructor will demo no needed)
- place in capillary tube w/ one open end
 - put tube in melting apparatus + heat slowly
 - Note to Range of melting

crystals are white and in the form of beautiful long needles

mass: 0.1625

mp: 156-159°C

RESULTS

Calculations

limiting reagent is ~~salicylic acid~~ methyl salicylate

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

$$= 0.213 \text{ g}$$

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

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 the carbons (the OCH₃) so it has 7 carbons and 7 peaks. The peak at 55.2 ppm for the OCH₃ 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 with the report sheet itself. OK to paste on back of page (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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.