



## Lab Report Notes

**Read This:** *This document contains notes/hints/suggested readings/corrections to help you with specific labs in Chem 0983. The notes are the opinions of this author, and may or may not be what your instructor wants. If you are not sure about something, ask your instructor.*

### General

- [1] (a) For chemistry, use metric graph paper, not the type with 1/4" squares. (b) All graphs must be done manually, not by computer (unless the teacher allows it).
- [2] Change the scale of your graph if it doesn't fit on one page. Never glue extra pieces onto your graph paper.
- [3] Make an effort to read the related material associated with a particular lab. Read the preamble in the lab manual. Read the related material in your textbook.
- [4] Some questions may have more than one correct answer.
- [5] Before you hand in your lab report, flip through the pages to make sure everything is there.

### Chemistry Spelling List

accuracy	discrepancy	metallic	soluble
affect (verb)	effect (noun)	occurred	sulfur (or sulphur)
aspirin	inversely	precipitate	valence
attached	it's (it is)	preparation	varying
combustible	length (not lenght)	proportional	visible
crystallization	magnesium	separate	yield
definite	manganese	similar	
dependent	meniscus	slope	

### GENERAL INFORMATION

Data can be classified as either qualitative or quantitative. Qualitative observations do not have numbers associated with them; however, it is still important to adhere to the lab instructions (e.g., if you are told to add about 1 mL of solution, don't add 5 mL). Quantitative experiments would involve the collection of numerical data. For a successful quantitative experiment, the following conditions should be met: (1) The reaction should be fully-completed (e.g., if the product involves a precipitate, it should be completely precipitated). (2) The product should be a stoichiometric compound of known composition. (3) The product should be pure.

### SPECTROSCOPY

- [1] (Question 2) Hint: Compare the flame colours of compounds with the same negative ion (say, chloride) and different positive ions. Were the colours the same or were they different?
- [2] (Question 3) Reworded: What does a spectroscope use to "resolve" light?
- [3] (Question 5) (a) Analogy: In a dark room, you turn on a flashlight. It still seems dark. How do you make the room brighter? (b) Reference: This question is discussed in Section 1-12 of "Foundations of Chemistry" (2<sup>nd</sup> ed) by Toon & Ellis ... available at the VCC (Broadway) Library (QD33 T66).
- [4] (Question 6) Reworded: Does an element's spectrum vary?
- [5] (Question 8) Internet search terms: Ander Jonas Angstrom, Northern Lights
- [6] (Question 9) Internet search terms: Doppler effect, astronomy

### HESS'S LAW: BOND ENERGIES

- [1] (General) Don't forget to read the footnotes at the bottom of the page in the lab manual.
- [2] (Question 1) Hint: In Table I, suppose if the initial temperature was say 1°C higher, would the final



- temperature be the same, or would it be different?
- [3] (Question 3) Determine the oxidation numbers (see textbook).
- [4] (Question 5) You already did this in Part 2.
- [5] (Aside) If you have a bottle of bleach around (maybe you should do the laundry now), you can look at the label to see what the % by mass should be. Your value should be close.

## MOLECULAR STRUCTURES: THE SHAPES OF MOLECULES

- [1] (Table) To determine the bond angle: (a) draw an imaginary line from an outlying atom to the central atom (b) repeat with another outlying atom. The smallest angle formed between these three atoms, with the central atom in the middle, is called the "bond angle".
- [2] (Table) The table has no title ... give it a title.
- [3] (Question 3) In other words, why are they on the central plane?
- [4] (Question 4) (a) Textbook talks about the other type of molecule. (b) Give examples of molecules, not ions.

## CHARLES' LAW

- [1] (Graph) (a) The scale of the "height of air column" axis **MUST** begin at zero. (b) When drawing the new axis, absolute zero (0 K) should correspond to your value of absolute zero in degrees Celsius. (c) Making your graph conveniently go through  $-273^{\circ}\text{C}$  will not get you any marks.
- [2] (Question 1) State the definition of an ideal gas. This question is not asking what the ideal gas law is.
- [3] (Question 2) Hints: What is the pressure equal to? Why does the oil plug eventually stop moving? What is being equalized? See "Charles' Law" in "Foundations of College Chemistry". Read the material regarding the gas cylinder with the movable or free-floating piston.
- [4] (Question 3) If you are not sure what is meant by vapour pressure, look up "Vapour Pressure" on the internet.
- [5] (Question 4b) From  $PV = nRT$ , solve for  $V/T$ .  $V/T$  represents the slope of the graph (actually, just proportional to it, since you really didn't measure the volume).
- [6] (Questions 6a & 6b) Show your work. Don't forget your units.
- [7] (Question 6e) Consider the following analogy. In an empty room, the volume of air =  $l \times w \times h$ . If you happen to walk into the room, the volume of your body has now taken up a substantial amount of space that could have been occupied by air. Thus, the volume of air is no longer equal to the volume of the room. The volume of air = volume of the room - volume of your body. Now, if you were a fly, the volume of air would be approximately equal to the volume of the room, since your volume (the fly) is such a negligible amount.

