Lab Report Notes

VANCOUVER
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COLLEGE

Read This: *This document contains notes/hints/suggested readings/corrections to help you with specific labs in Chem 0993. 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.
[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.

REACTION RATES: THE IODINE CLOCK REACTION

[3]   (Data & Calculations, #1) For Table #1, use the total volume of the <u>mixture</u> when calculating $[IO_3^-]$. This is the volume of the mixture at the exact moment timing began.
[4]   (Data & Calculations, #3: Tangential Method) (a) Find the two points on the graph. Be sure to show these two points clearly. (b) Draw a tangent line at each of these two points. The tangent line to each point should touch the curve only at the point in question. (c) Determine the slope of each of these tangent lines using the rise-over-run method.

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[5]   (Graphs) Indicate what the units are for all quantities plotted (e.g., the concentration has units, too).

[6]   (Discussion) Make sure you discuss and interpret what each graph shows. Writing an essay about reaction rates will only cause you to lose marks.

[7]   (Questions 2-5) Use words like "inversely proportional" or "directly proportional" to describe the relationships.

[8]   (General) (a) Reaction rates can be described as fast or slow. (b) Reaction times can be long or short. (c) A statement like, "The reaction time is slow", is hard to interpret. (c) Reciprocal time ... what's that? The term, $1/t$, is proportional to the rate of completion of the slowest step (reaction #1). Thus, by plotting concentration vs $1/t$, you can infer the relationship between the concentration and the rate.

[9]   (General) Volume and concentration are not the same thing.

CHEMICAL EQUILIBRIUM: LE CHATELIER'S PRINCIPLE

[1]   (General) When you want to increase the concentration of a particular species involved in an equilibrium system, all you have to do is add more of that species. When you want to decrease the concentration of a particular species, you cannot just reach in and remove some of that species. To do so, one must reduce the concentration chemically. The concentration of an ion can be reduced by adding something that will react with it to form either (a) a molecular species, (b) a complex ion, or (c) a precipitate.

[2]   (Tables - General) It is highly-recommended that you write the equilibrium system equation above the data table along with the colours observed below the equation.

[3]   (Table 1) In the "Reason for Equilibrium Shift" column, indicate which species [i.e., Fe^{3+}, SCN^- or $Fe(SCN)^{2+}$] increased or decreased. This is the initial "stress" that started the "shifting".

[4]   (Table 2) In the "Reason for Equilibrium Shift" column, indicate which species [i.e., H^+ or something else] increased or decreased. This is the initial "stress" that started the "shifting".

[5]   (Table 3 & 4) In the "Reason for Equilibrium Shift" column, indicate what caused the shifting [i.e., temperature increase, temperature decrease, etc ...].

[6]   (Questions 1 - 3) All explanations should relate to Le Chatelier's Principle.

INDICATORS and pH MEASUREMENT

[1]   (Table 1) In the column that says, "pH (comparing colour with buffer)", it is asking for the pH values, not the colours.

[2]   (Question 1) Comment on solutions where the pH differs greatly using the universal indicator as compared to the pH meter. This question is not asking about the accuracy (that's Question 2).

[3]   (Question 4) The answer should be expressed in proper scientific notation. Do not have decimals in the exponent.

[4]   (Question 5) Look up what an indicator is in your textbook.

[5]   (Question 6) (a) Note: Bromocresol green is not the same as the indicator that you used in the lab. (b) If your reference is a web site, state the complete link to the exact page where the information can be found. This info can be found on millions of web sites, so don't everyone go to the same one or copy from someone who did. (c) Do not use info from the "oilfield" web site ... it isn't accurate.

ELECTROCHEMICAL CELLS: THE ELECTROPLATING OF COPPER AND DETERMINATION OF AVOGADRO'S NUMBER

[1]   (Data Table) (a) Show sample calculations for all calculated quantities.
[2]   (Question 1) Compare the two values to EACH OTHER, but doing a percentage difference calculation.
[3]   (Question 2) Calculate the % error for each value of Avogadro's number found.
[4]   (Question 3) Hint: Consider the number of electrons involved in the deposition of one Ag atom.
[5]   (Question 4) (a) Actually determine the value of e ... don't just explain it. You want to see if what you come up with works or not. (b) Don't use the value from Line 8 (number of electrons passed), or any subsequent line that uses the value from Line 8 (i.e., Lines 9-10), to answer this question. In the experiment, Line 8 was calculated assuming that the electron charge was given. If you used Line 8, your answer will yield the accepted value for e. You will have officially gone in circles. (c) Hint: Calculate the charge per electron (i.e., divide the charge by the number of electrons).
[6]   (Question 5) Hint: Question is asking you to calculate the charge per moles of electrons (i.e., divide the charge by the moles of electrons).
[7]   (Questions 4-5) The best way to do these two questions is to use Line 11 (moles of Cu deposited/removed).

OXIDATION-REDUCTION TITRATION

[1]   (Questions 1 & 2): Many answers to these two can be found on the web.
[2]   (Questions 3 & 4): Read the lab handout.