

Chem 371 Lab Rybolt Policy Statement and Directions for Lab Reports**Lab Policy****Reports**

Lab reports done on the previous two weeks are due at the beginning of the lab period (first five minutes) on the days indicated on the schedule sheet. **Late lab reports are not accepted.** If you miss a lab or need more time to complete calculations you may delay turning in **one lab during entire semester** till the end of semester, but not the first report due. You must give me a note on the due date indicating that a lab due that day will be your one make-up lab. Graded lab reports are returned to you on the week after they are turned in to me. You may look at the graded lab reports during this lab period, but you are to return the lab reports to me and not take the graded reports from lab. I will retain graded lab reports. You should write on a piece of paper that take with you the things that were marked wrong and need to be done different on next reports.

You will be given instructions on first lab meeting for the format to use in your lab reports. If you do not follow this format you lab report will not be accepted.

Grades

Your lab grade is based on your lab reports. In addition you may have other assignments while not formally averaged into your grade that must be completed in a timely manner to pass the course. **Also You Must Maintain A Proper Laboratory Notebook** to pass the course. The laboratory grade comprises 25% of the Chemistry 371 course grade.

Attendance

You are expected to attend all sessions of the course. If a laboratory period is missed for an acceptable reason, you will have an opportunity to make up the missed experiment at the end of the semester. You are expected to arrive on time for lab. Usually I'll open the lab door a few minutes before the scheduled start of lab

You should work during the entire lab time. If you are finished collecting data then you should work on analysis. If you are finished with analysis then you should work on the report in the chemistry library. You should not leave until near the end of the lab period so you can ask questions about reports during lab.

You should complete your calculations or know how you are going to complete calculations before you leave lab. If you have any questions, talk to me about your plans to complete lab before you leave.

Honor Code

You are expected to perform all measurements with your partner and to record all data yourself. It is a violation of the UTC Honor Code to submit copied or fabricated data. You are expected to write your report alone. **If your report is copied from partner or another even in part, then you will both receive a 0.** You may discuss the report and calculations with your partner, but the report should represent your own efforts exclusively. It is a violation of the UTC Honor Code to submit a laboratory report that is copied in part or in whole.

Lab Reports (Rybolt) – Refer to this page prior to and while writing each report**Different Experiments Involve Submitting Different Things So You Need To Check List (On Separate Page) Of What Is Required For the Report You Are Writing.****When Writing Your Lab Reports Make Sure You:**

Follow the format given by the professor in charge of your lab section.

Write or type your lab report on standard 8.5 x 11 inch paper stapled together in the upper left hand corner. Do not use paper ripped out of a spiral binder. Xeroxes are not allowed.

Your report must be legible and neat, or it will not be accepted.

Strive for conciseness, clarity, and logic.

Use proper English (this includes grammar, spelling, punctuation, syntax, etc.) Your report grade will be lowered if there are errors in language usage. You must use conventional scientific style and write reporting what was done not as if giving directions to do.

Unacceptable: "I dissolved 4.0g of NaCl in 100mL of water."

Unacceptable: "Dissolve 4.0g of NaCl in 100mL of water."

Acceptable: "4.0g of NaCl were dissolved in 100mL of water."

Label each main section in the report.

Identify all **symbols** used by name and indicate **units**.

Number in order any **equations** used. Place the number of the equation in parentheses to the right of the equation.

Present numerical data in **tables** with columns labeled and units indicated.

Include on your **figures** a title, labeled axes with units indicated, and even incremental spacing along each axis with the increments clearly shown. Have symbols such as a circle that represent each data point and can be clearly seen. If more than one type of data is on the figure distinguish the points by using a different symbol for each type. Figures should be referred to by number and should be included in your report.

References should be numbered in order of appearance in the body of your lab report and referred to in the report by number. List the author, journal, pages, and year for articles. List the author, title, publisher, location, year and pages for a book.

Report Format (Rybolt)

(Refer to this page prior to and while writing each report)

On computer plots that were used for linear regression, be sure to write the slope (with units), intercept (with units), and correlation coefficient on the graph. Make sure each figure includes a descriptive title and labeled axes.

A complete report format (which we are not using) would include introduction, experimental, and discussion sections as well as theory and analysis. We are using an abbreviated lab report format that emphasizes the data, analysis, and results. The style you should use is explained below.

First page (this is one single page) of report must include the following:

top of page: Write two letter abbreviation of experiment, experiment title, your name, partners name (make clear whose report it is), date

middle of page: Stated in a few clear sentences is a summary of your experiment—that is the specific objective (name of chemical used and property sought), your result, and comparison to literature value when available. Report your value, accepted lit value, and give the percent error. If you think you did something wrong or there was an unusual problem in experiment state that here also.

bottom of page: List references.

Following this one cover page above you will present a partial report typically involving a few pages of data and analysis and graphs. Report formats you must follow for each experiment are indicated on the following page.

Some reports will include data and analysis sections. These are explained below:

DATA List in tables the data exactly as they were taken to the lab. Whenever possible, it is best to combine all data, primary data along with data generated in analysis, into one table. Symbols must be defined and units must be given. . Tables should have a descriptive heading and be numbered by Roman numeral.

ANALYSIS In this section you explain in a step by step manner writing in complete sentences how the data was analyzed. In other words how does one get from the primary data to the final results. This procedure will rely on the relevant theoretical and empirical equations. Make sure the symbols used in the equations are clearly defined and that equations are numbered sequentially. Include in the table or tables intermediate and final results and make it clear what the connection is to the primary data. Refer to the figures as necessary whenever data is plotted. Remember, the key purpose of the analysis is to explain exactly how you got from data collected in lab to the final results. You are writing in a style like you would find in a textbook or research article—in sentences. NOT in outline form.

FIGURES Number each figure (1, 2, etc.) and give a descriptive title. Present Figures together in order after Analysis section.

Report Style (Rybolt) For Each Experiment:

(Refer to this page prior to and while writing each report)

All reports will have a one page COVER PAGE followed by:

AS DATA, ANALYSIS, GRAPHS

Table with data to clearly indicate numbers used and Macintosh plots. Show the calculation of surface area with unit conversion included. You can show calculation on plot of Cf/N vs Cf.

EX DATA, ANALYSIS

Table with literature values, data used in calculations, and results including: relevant electric heating data: voltage, resistance, heating time, mass of water, ΔT from electrical heating; results of heat capacity, C_p , average of C_p ; results of each of the runs ΔT and average ΔT ; experimental ΔH (kJ); experimental ΔH (kJ/mol); and calculated literature ΔH (kJ/mol).

FP DATA, ANALYSIS, GRAPHS

MacTemp plots of experimental data and Table of all key data used in calculations to determine molar mass.

HV DATA and GRAPH

Plot and comparison of analysis and literature value. On plot show intercept, correlation coefficient, slope, and calculation of ΔH value.

IS DATA, ANALYSIS, GRAPHS

Plots of data and summary tables of calculations and results.

LV DATA and GRAPH

Plot of data - identify clearly and draw arrow to azeotrope. Can draw by hand curves through points.

ME FOUR PAGES TO SUMMARIZE STERIC ENERGIES**MM SPECIAL PAGES summarizing results****RO GRAPHS and TABLE with summary of k and r^2 values for different reaction order plots.****SM DATA, ANALYSIS, GRAPHS and TABLES**

Show clearly how equations derived and calculations done and make comparison to experimental values.

Check List - things to look for in writing reports that could be marked wrong

(Refer to this page prior to and while writing each report. I will use indicated codes to mark)

Cal - errors in calculation or not clear how calculation was done

Eng- errors in English language usage

Format- did not follow the format that I gave you for report

Graph - graph missing or done incorrectly

key - did not show the key numbers used in calculation, numbers need to be in table or
given if used in equation in analysis

L - literature value of measured property no given or wrong

ref - did not include references

sen - did not write in complete sentences

sf - significant figures are in error - the usual problem is too many sig fig

Table - table missing or done incorrectly

UI - gave me unnecessary information

u - units are wrong or not included

X - wrong or error (for example calculation done incorrectly)

! - information missing

? - not clear what or why something was done

This represents style to use

Analysis

From Data in Tables I through III, a graph for each temperature was obtained of $\ln(Q-Q_z)$ versus Times (see Figures 1 through 3). From each of these graphs a value for k' , the rate constant, was determined as follows with the equation representing the form of $y=mx + b$.

$$\ln[Q-Q_z] = -k't + \ln[Q_0-Q_z] \quad (1)$$

$$\text{slope} = -k' = -0.000425 \text{ 1/s}$$

$$k' = 0.000425 \text{ 1/s}$$

A value for k' was obtained for each graph and was then used along with the hydrogen ion concentration of 0.500 M to calculate k , the overall rate constant, for each graph.

$$k = k'/[H^+] \quad (2)$$

$$k = 0.000425 \text{ 1/s} / 0.500$$

$$k = 0.000850$$

Data in Table IV was used to construct a graph of $\ln k$ versus $1/T$ (Figure 4). From this graph the values for the energy of activation and the frequency factor for the sucrose reaction were determined with the energy of activation, E_a , being equivalent to the slope of the line divided by the gas constant, R (in units of energy) and the frequency factor, A , being equivalent to the natural base e raised to the y -intercept.

$$\ln k = \ln A + (-E_a/R)(1/T) \quad (3)$$

$$y = (-E_a/R)x + \ln A$$

$$\text{slope} = -E_a/R = -13,100 \text{ K}$$

$$y\text{-intercept} = \ln A = 35.539$$

$$E_a = \text{slope} \times -R \quad (4)$$

and so on