

Calorimetry Lab Expectations and Grading (**Due Feb 3, 2022**)

Chem 112000-2: Section-33

January 30, 2022

1 General Remarks

This must be typed. Any portion that is handwritten will not be graded. Furthermore, please use the equation editor for any mathematical equations that you use! Points will be deducted for messy equations and sample calculations. Make sure your lab partner's name is on the report as well as my name. All figures and tables should have a caption explaining what they contain. Lastly, do not plagiarize the lab manual! Ensure you cite where necessary, and all citations follow ACS style (see Journal of the American Chemical Society for examples of what this looks like in publications). Note this assignment is due Thursday **Feb 3, 2021** at 5:30 pm.

If something still doesn't make sense, please email me!

2 Pre-Lab Questions (10 points)

Question 1 is worth 4 points and question 2 is worth 6 points.

3 Introduction (10 points)

Provide any background information regarding calorimetry as needed as well as the general purpose of the lab. Show how what experimental quantity we will be measuring can allow us to directly (or indirectly) calculate ΔH_{rxn} . You should also mention and show the 3 reactions that you performed in lab (make sure proper formatting!). Make sure to cite your sources and do not plagiarize the lab manual!

4 Procedure

Only report deviations from the lab manual here. A citation is required here.

5 Data Analysis (50 points)

In this section you should report your experimental results. This should be in the form of 4 graphs of temperature versus time. Make sure your graphs are properly labeled.

You should then describe how you determined T_i and T_f from the graph (use what ever method makes the most sense with the data you have). Then you should create a table similar to that in the lab manual on page 64 (the last value being the calorimetry constant). Further include a table similar to that on page 65 where it reports the temperatures for the 3 reactions.

Lastly, report the ΔH_{rxn} in J/mol or kJ/mol for each reaction. This should be in a table (or you can include it in the previous table!). You should also state explicitly any assumptions you make as well as specify any constants you used from the lab manual when calculating ΔH_{rxn} .

Remember to give each figure and table a caption. See examples of what this looks like.

6 Discussion (20 points)

Report explicitly the calorimetry constant you calculated as well the percent error from the value I gave you (19 J/K). Direct the reader to the appropriate table for the ΔH_{rxn} values (do not need to list out the values). Discuss the results in the context of the literature. That is, if literature values exist for these reactions report them (citation!) and discuss if they agree or differ with them.

Each subquestion in the lab manual (there are 3 of them) is worth 5 points each. When discussing errors, indicate how they would directly influence your final ΔH_{rxn} or the calorimetry constant.

For ‘how to improve the experiment’ you should **not** just say that multiple trials should be done. Instead, be creative and think of different experimental techniques that could be used to more accurately study the Δ_{rxn} or calorimetry constant, etc.

7 Sample Calculations (5 points)

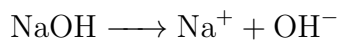
‘ You only need a total of 3 sample calculations:

1. Calculate calorimetry constant
2. Calculate calorimetry constant % error
3. ΔH_{rxn} for a reaction

Do not include more than this or points will be deducted. Sample Calculations can be included at the end of the Data Analysis section, or at the end of the lab report in an Appendix section. This is a matter of preference.

8 Organization and Writing (5 points)

A lab report is a formal document. It should be well written and properly organized. This document I provide to you should give you the proper framework of what to include in the report and where to include. Make sure you cite your sources using ACS style, all equations and chemical equations are formatted properly using the equation editor, and all graphs and tables have a caption and proper labeling. For example, do NOT write $\text{NaOH} \rightarrow \text{Na}^+ + \text{OH}^-$, this is sloppy. Instead



is much neater.