

Abbreviated Report | Calorimetry

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Due Oct 6 by 11:59pm **Points** 15 **Submitting** a file upload
File Types doc, docx, and pdf

The post-lab assignment for this experiment is an abbreviated technical report that includes an *Abstract* section plus the *Core (Data and Results, Discussion)*. First, work up your data using the [data workup template \(https://gatech.instructure.com/courses/334258/files/44546431?wrap=1\)](https://gatech.instructure.com/courses/334258/files/44546431?wrap=1) ↓ [\(https://gatech.instructure.com/courses/334258/files/44546431/download?download_frd=1\)](https://gatech.instructure.com/courses/334258/files/44546431/download?download_frd=1) for this experiment, a Microsoft Excel spreadsheet that will help you organize your data, calculations, and plots. Then, use the [abbreviated report template \(https://gatech.instructure.com/courses/334258/files/42100995?wrap=1\)](https://gatech.instructure.com/courses/334258/files/42100995?wrap=1) to complete the report.

All tables, figures, and writing should meet the minimum expectations described in the [Guidelines for Post-lab Assignments \(https://gatech.instructure.com/courses/334258/pages/guidelines-for-post-lab-assignments\)](https://gatech.instructure.com/courses/334258/pages/guidelines-for-post-lab-assignments).

Abstract

The *Abstract* is a brief summary that summarizes for a casual reader the background, major results, and implications of an experiment. Address the following items in paragraph form to complete this section.

1. Provide very brief background information that communicates the purpose and motivation of the work.
2. Describe the most important results of the experiment.
3. Briefly summarize the major conclusions of the work.
4. Ensure that the entire Abstract is less than 275 words.

Writing the Abstract *after* you have completed the other sections is strongly recommended!

Core (Data and Results, Discussion)

To complete *Data and Results*, copy and paste required figures from your data workup spreadsheet, replacing the placeholder boxes.

To complete the *Discussion*, address the following items in paragraph form. Do not include the prompts in your submission; weave your answers together into a coherent narrative. Construct equations using the Equation Editor built into Microsoft Word or an [online equation editor \(https://csdn.codecogs.com/eqneditor/editor.php\)](https://csdn.codecogs.com/eqneditor/editor.php). If you use an online editor, include equations as images, not text.

1. Using a trial of your choice from Table 1, calculate C_{cal} for your calorimeter. Describe your approach using a series of mathematical equations and explanatory text. Consider your audience a future CHEM 1310K student looking to replicate your work. Include an explanation in words of the heat balance upon which the calculation is based.
2. Using the first reaction results and your mean C_{cal} , calculate ΔH_{ox} for the oxidation of the metal in kJ/mol. Describe your approach using a series of mathematical equations and explanatory text. Consider your audience a future CHEM 1310 student looking to replicate your work.
3. Show how your experimental or measured value of ΔH for the oxidation of the metal oxide you chose in Part C was determined. Explain how reactions with known enthalpies (including your measured ΔH_{ox}) can be combined to produce the overall metallic oxidation reaction (Hess' Law). Then, show how the enthalpy of the metallic oxidation reaction can be calculated using a series of mathematical equations and explanatory text. Consider your audience a future CHEM 1310 student looking to replicate your work.
4. Report the percent error of your measured ΔH for the metallic oxidation reaction when compared to the standard enthalpy of formation (see protocol). Showing the calculation is not necessary.

Save the report as a PDF file and upload it here to complete this assignment. Do not upload your data workup spreadsheet.

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Criteria	Ratings				Pts
Abstract: Background Information	1 pts Full Marks Background information adequately orients the reader to the results and conclusions of the work. Calorimetry is succinctly defined.			0 pts No Marks	1 pts
Abstract: Major Results	1 pts Full Marks All major results of the experiment are communicated succinctly and consistently with the rest of the text.			0 pts No Marks	1 pts
Abstract: Conclusions	1 pts Full Marks Abstract succinctly explains how the results support or do not support the utility of calorimetry for measuring reaction enthalpies.			0 pts No Marks	1 pts
Data and Results	3 pts Full Marks Tables 1 – 3 are present and filled in with values to the appropriate level of precision.	2 pts Good One table is incomplete or contains a value with more than four digits.	1 pts Fair Two tables are incomplete or contain a value with more than four digits.	0 pts No Marks All tables are incomplete or contain a value with more than four digits.	3 pts
Discussion Item 1	2 pts Full Marks (1) Discussion includes a correct heat balance equation for calorimeter calibration that is also described correctly in words. (2) Measured quantities and any intermediate values are listed with units and no more than four digits.		1 pts Partial Credit One of the two criteria is met.	0 pts No Marks	2 pts
Discussion Item 2	2 pts Full Marks (1) Discussion includes a correct heat balance equation for calorimetry that is also described correctly in words. (2) Measured quantities and any intermediate values are listed with units and no more than four digits.		1 pts Partial Credit One of the two criteria is met.	0 pts No Marks	2 pts
Discussion Item 3	2 pts Full Marks		1 pts Partial Credit	0 pts No Marks	2 pts

Criteria	Ratings			Pts
	(1) Discussion correctly shows how known reactions can be scaled, reversed, added, etc. to produce the oxidation of the chosen metal by aqueous hydrogen peroxide. (2) Measured enthalpies are properly combined based on (1) to calculate the enthalpy of the metallic oxidation reaction with appropriate	One of the two criteria is met.		
Discussion Item 4	precision. 2 pts Full Marks (1) Enthalpies of formation are combined appropriately to calculate a theoretical enthalpy of the metallic oxidation reaction. (2) The theoretical enthalpy has appropriate precision, units, and sign.	1 pts Partial Credit One of the two criteria is met.	0 pts No Marks	2 pts
Discussion Item 5	1 pts Full Marks Percent error of the measured enthalpy of the metallic oxidation reaction is calculated correctly and reported with appropriate precision.		0 pts No Marks	1 pts
Total Points: 15				