

THE FORMAL LAB REPORT

In order to encourage development of written communication skills, formal lab reports or communications will be written for the laboratory portion of this course. These reports will be in the format of a chemistry Communication for submission to the *Journal of the American Chemical Society (JACS)* and will cover all of the work of the projects as a unit, not as individual experiments. For example, the series of three experiments related to metal acetylacetonate syntheses and characterizations will be written as one single communication. The reports should reflect what you personally did and observed during your lab work. Whenever possible, comparisons should be made to published journal articles and outside literature references related to the experiments.

The text of formal lab reports is written in complete sentences and must be typed. Data tables and figures must be numbered, referenced in the text, and have descriptive titles. You must download and use the prepared Template for Communications from my website for all reports: <http://www.apsu.edu/jonesr/inorganic-chemistry> . A sample communication is available on the website for your review. Your communications will include the following sections:

Title

- A unique and explanatory short description of the report.

Abstract

- A brief synopsis of the key points of the report.

Introduction

- Discussion of the background to the problem addressed in these studies.
- As appropriate, incorporate information from at reviews or articles on this subject
- Any necessary chemical background to place the experiments in context.
- Answer the question “*Why are the experiments significant?*”

Experimental Methods

- Descriptions of the syntheses, procedures followed, and/or methods employed
- Write so that someone else can read it and reproduce your results
- Answer the question “*What did you do?*”

Results

- Observations and experimental results, including descriptions of the compounds made and figures and/or tables of the data you collect
- Answer the questions “*What did you make and what did you see happen?*”

Discussion

- Interpret your results in terms of their chemical implications and the broader context
- Make comparisons between observations for different complexes, and correlate results from different experimental methods (i.e., UV/Vis energies and magnetic susceptibility)
- Answer the question “*What do your results mean?*”

References

- Give a complete list of all references used in writing the report.
- Include COMPLETE addresses for web resources.

The following edited and detailed description of a formal report is adapted from “Writing a Scientific Paper”, Chapter 1 from *The ACS Style Guide*.¹ Not all information contained herein is relevant to writing a Communication for this course, although most ideas are very applicable to all levels of scientific chemical writing and should be considered.

Abstract

Briefly state the problem or the purpose of the research. Indicate the theoretical or experimental plan used and summarize the principal findings. Point out your major conclusions. Plan to write approximately 1-2 sentences for each major section of a full report. When possible, write the abstract last to be sure that it accurately reflects the content of the paper. Do not supplement or evaluate the conclusions in the text. The optimal length is one paragraph; between 80 and 200 words is usually adequate.

Do not cite references, tables, figures, or sections of the paper in the abstract. Do not include equations and structures that take up more than one line. Use abbreviations and acronyms only when it is necessary to prevent awkward construction or needless repetition. Define abbreviations at first use in the abstract and again at first use in the text.

Introduction

A good introduction is a clear statement of the problem or project and the reasons that you are studying it. This information should be contained in the first few sentences. Give a concise and appropriate background discussion of the problem and the significance, scope, and limits of your work. Outline what has been done before by citing truly pertinent literature, but do not include a general survey of semi-relevant literature. State how your work differs from or is related to work previously published. Demonstrate the continuity from the previous work to yours. The introduction can be one or two paragraphs long.

Experimental Methods

In research reports, this section can also be called “Experimental Details”, “Experimental Section”, or “Materials and Methods”. For experimental work, give sufficient detail about your materials and methods so that other experienced workers can repeat your work and obtain comparable results. When using a standard method, cite the appropriate literature and give only the details needed.

Identify the materials used, and give information on the degree of and criteria for purity, but do not reference standard laboratory reagents. Give the chemical names of all compounds and the chemical formulas of compounds that are new or uncommon. Use meaningful nomenclature; that is, use standard systematic nomenclature where specificity and complexity require, or use trivial nomenclature where it will adequately and unambiguously define a well-established compound.

Describe apparatus and procedures used. Avoid using trademarks and brand names of equipment and reagents. Include precautionary handling procedures, special waste disposal procedures, and any other safety considerations in adequate detail so that workers repeating the experiments can take appropriate safety measures.

Results

Summarize the data collected and their statistical treatment. Include only relevant data, but give sufficient detail to justify your conclusions in the Discussion section. Equations, figures, and tables may be used for clarity and brevity, but not in lieu of text describing results. All figures and tables must be referenced clearly in the text of the report.

Discussion

The purpose of the discussion is to interpret and compare the results. Be objective. Point out the features and limitations of the work. If possible, relate your results to current knowledge in the field and to your original purpose in undertaking the project. Answer the questions: What knowledge have you gained from your data? Have you resolved the problem? What exactly have you contributed? Briefly state the logical implications of your results. If your experiments did not adequately address the stated problem or the results were ambiguous, suggest further directions of study.

References

Give a complete list of all references used in writing the report. Include COMPLETE addresses for web resources. Refer to the following website for complete instructions on how to cite various reference types: <http://pubs.acs.org/books/references.shtml>

Do not plagiarize any source. Plagiarism is the use of the ideas, words or findings of others without acknowledging them as such and attempting to pass them off as your own. Plagiarism gives the impression that the student has written, thought or discovered something that he or she has in fact borrowed from someone else without acknowledging this in an appropriate manner.² Plagiarism is a form of intellectual property violation³ and is considered Academic Misconduct at APSU. The penalty for plagiarism will be a score of zero (“0”) on the report in question and the incident may be referred to academic affairs for disciplinary action.

To avoid plagiarism, you must give credit whenever you...

- use another person’s idea, opinion, or theory;
- use any facts, statistics, graphs, drawings—any pieces of information—that are not common knowledge;
- use quotations of another person’s actual spoken or written words; or
- paraphrase of another person’s spoken or written words.

References

¹ Adapted from Writing a Scientific Paper, <http://www.oup.com/us/samplechapters/0841234620/?view=usa#BIB>
Chapter 1 from *The ACS Style Guide, A Manual for Authors and Editors*, Second Edition, Janet S. Dodd (ISBN 0841234620), May 1997.

² www.keele.ac.uk/depts/aa/regulationshandbook/sectiond.htm

³ onlineethics.org/glossary.html