

Guide to Writing Scientific Laboratory Reports

Chem 146B, Spring 2009

Report writing skills are an important part of a science education and will be required for any subsequent career in science. The ability to effectively communicate ideas and results is crucial whether one goes on to graduate studies, directly into industry, or into any area related to chemistry. The ACS Style Guide is an excellent source of information on writing a scientific laboratory report.¹ Text should be double-spaced, left- or fully-justified and written in the impersonal, passive voice. Written laboratory reports for this course will be at least eight pages in length, not including figures such as spectra. The number of pages depends on the experiment that was performed. The third report will be 10 minute presentations (plus time for questions) in pairs during the last week of classes.

There are seven distinct sections of a laboratory report or journal article and should follow the format of an ACS article in *Inorganic Chemistry* or *Journal of the American Chemical Society* (<http://pubs.acs.org/journal/jacsat>, also see links on the 146B website):

1) Title and Author. The title should be succinct and original, not from the lab handout. The title describes the experiment in approximately four to fifteen words and should be written last, when the author has a clearer understanding of the experiment.

2) Abstract. The abstract is a brief, one paragraph summary of the experiment and is the author's opportunity to capture the reader's attention. It should highlight outstanding features of the experimental results such as new reaction pathways, key spectroscopic results, synthetic discoveries or difficulties that were overcome. Name the characterization method(s) used and include pertinent quantitative results such as figures of merit, wavelength of absorption or percent yield. As for the title, the abstract should be written last. Only this section should be single-spaced.

3) Introduction. The introduction for this course is at least two pages in length. Some examples of the basic questions that should be addressed: 1) brief introduction to the subject material and its importance; 2) objectives of the study; 3) theory behind the method(s) of analysis; 4) choice of ligand. Use only proper literature references (i.e. journal articles or books, not URLs), number sequentially and place in the references section (see #7, below).

4) Experimental. The experimental section is written as prose (i.e. not point form) and uses the *past tense* and *passive voice* to explicitly and sequentially describe the actual experiment. The goal is to enable other scientists to duplicate your work. This section includes, but is not limited to: a complete description of the reagents, including the order, quantities and method for their addition; a written description of the experimental apparatus, including brand and model numbers where appropriate; a schematic of more complex apparatus could be useful. Authors often write the experimental section first

since this section simply reports the method in a conventional format without the need to explain the results.

5) Results and Discussion. The results and discussion section presents the data that was acquired in the experiment and interprets the data. All tables (e.g. % yield, M.P., ϵ and IR stretches should be tabulated) and figures must be properly labeled, sequentially numbered *and contain a suitable caption*. Spectra and graphs should clearly display axis labels and units. While the experimental section delineates specific details that may include quantities and grades of reagents, this section gives the observations and discusses the impact of the results from a theoretical and technical viewpoint. Whenever possible, the experimental results are compared with those reported in the literature. This section may be broken into two separate sections if desired. In this case, the results section displays or summarizes the data collected, while the discussion section interprets the data.

6) Conclusions. What does it all mean? The conclusions are **not** a simple summary of the experiment, or a repetition of points that were made earlier in the report such as the abstract. It should be one paragraph in length, and tie together all of the data in a manner that makes some sort of statement as to the relevance of the results. Other possible topics include discussion of future work or development, or the efficacy of the method.

7) References. *There must be at least five relevant literature references sited.* Peer-reviewed scientific journals and books are the primary source for these references; *websites are not a valid source* (but can be used beyond the five minimum). The writing format of the references should follow that found in the journal *Inorganic Chemistry*, *J. Am. Chem. Soc.* or the ACS Style Guide.¹ The main method nowadays for finding literature on a desired subject is through scientific search engines to which the campus subscribes, namely SciFinder Scholar and Web of Science (link on the 146B website). These crucial search engines allow one to search the vast array of scientific journals, books and conference proceedings. Note that the article type may be further specified when searching, such as reviews. In addition, the Science & Engineering Library contains many hardcopy sources ideal for inorganic chemists,²⁻⁴ though note that reference texts may not be checked out. Some references will be placed on the 146B website.

References

1. The ACS Style Guide: A Manual for Authors and Editors; Dodd, J. S., Ed.; American Chemical Society: Washington, DC, 2006 (Science & Engineering Library, Reference Section, QD8.5 .A25 2006).
2. Chemical Abstracts; American Chemical Society: Columbus, Ohio, 1907- Present. (Science & Engineering Library, Reference Indexes and Abstracts, QD1.C43)
3. Dictionary of Organometallic Compounds, Buckingham, J., Ed.; Chapman & Hall: London, 1984. (Science & Engineering Library, Reference Section, QD 411 .D53 1984)
4. Encyclopedia of Inorganic Chemistry, King, R. B. (Ed.); Wiley: New York, 1994. (Science & Engineering Library, Reference, Chemistry Corner, QD 148 .E53 1994)