

These notes are given only as guides and examples, and none of the Introduction, Data Analysis, or Discussion topics given here must be included in your Lab Report 1. You should decide on your own what are the important topics to cover in these sections of your lab reports; topics other than what I have listed may also be important to include. This guide for Experiment 1 is meant only as an example.

Title

Deciding on an original title, that describes the experiment as a whole, is best.

Possible Introduction topics:

What is the HSAB theory? Explain in terms of periodic properties.

What is the Nernst equation, and what information can be gained from it? Write equations for the various quantities that can be determined using the Nernst equation and its results.

How does use of the Nernst equation allow us to assess ligand/metal HSAB properties?

When you use abbreviations (such as salen, and Δ_o , en, and acac⁻, which you will see in later labs) for the first time, make sure that you define them. It is important to use abbreviations, as some complex names are very long.

Suggestions for Data analysis:

While scientific papers have an experimental section where procedures are described, this class has no such requirement. Only include as much info as is necessary to **explain** your results, and leave the rest for your lab notebook pages.

When syntheses or reactions are included in labs, you should definitely mention whether your reactions were successful or not. If successful, include percent yields. If not, mention if the problem was with the synthesis (and when your observations diverged from the expected observations) or with the recrystallization (Note: if you cannot crystallize a compound, liquid phase spectra should still be good). In the discussion section, suggest reasonable causes (and solutions, if possible) for the problems you experienced.

You should give, possibly in tabular format, your data about the reactions you did and your conclusions about what occurred in each one. Any data in a table or tabular format should be listed in a sensible order (like first reaction to last, or complexation by one kind of ligand and then another, then the third).

It is important to definitively identify the species you are working with and which reaction you are doing, especially in this lab where there so many copper reagents. Also, make sure that your typing of reagents and products is clear and readable.

You should have a section analyzing the results of your experiment that tests the three oxidations states of copper when ligated by salen.

Possible Discussion Section topics:

One part of the discussion should be about scientific concepts

What do the various experiments qualitatively tell us about the stabilities of the three oxidation states of copper in the presence of different ligands? List the ligand systems in order of hardness or softness.

What should we see in the calculations of the electronic potentials of the redox reactions? Do they quantitatively confirm the qualitative results or not?

Discuss your approach to determining the stabilities of copper oxidation states with salen, and what this experiment showed.

The other part of the discussion should be an experimental discussion

If your reactions did not work, give your best explanation for why. If your observations and your calculations contradict each other in any case, attempt an explanation.

Answer any unnumbered questions in one or the other parts of this section.

Questions:

Write equations and calculations clearly and fully. Avoid answering questions with only a few words; give the reasoning behind your answers.

General notes:

Text should be double-spaced, or at the very minimum, written with 1.5 line spacing.

Section headings (**Introduction**, **Data Analysis**, **Discussion**) should be on their own line, and should be in bold type.

It is good to be clear about what your primary measured quantity is (in this case, however, there are only your observations). Any derivative quantities you calculate (in

this case, E_o 's would be derivative calculated quantities) should not have more significant figures than the primary measurements you may have made. There is no primary measured quantity in this lab, only your observations, but this rule should be observed whenever there is a primary measured quantity.

Don't be sloppy on subscripts: usages like H_2O and $Cr(en)_3$ are inappropriate.

Do not use exponential forms of numbers ($4.79e-7$) in written reports. Write out powers of ten in full instead (4.79×10^{-7}).

Your report should be clear, well-organized, complete, and flow easily from one section to the next. An unreadable or carelessly written report is very difficult to understand and grade, and will be marked down.