

The main purpose is to report the results of your experiment and calculations, but the background theory will be necessary to explain and interpret your results. This is a formal report; you can organize the information in any way you want, as long as the essential information is included. Refer to the *Guide to Written Reports* from class for more detail. The clarity of the report, including grammar and spelling, are important to your score as well.

1 Abstract

[2] A short summary of the purpose and results of the lab, including what technique was used, what molecules were studied and what specific characteristics and values were measured. Error bars and comparison to literature values are absolutely necessary here.

2 Introduction

[12] Interpreting your data requires an understanding of the theory of magnetism. In your own words, please detail the motivation, method, materials and relevant theory.

- What is paramagnetism? Diamagnetism?
- How is magnetic susceptibility related to magnetic moment?
- How is the number of unpaired electrons related to the magnetic susceptibility?
- How do different ligand fields affect the magnetic susceptibility?
- Briefly describe the procedure.
- What is the physics behind the Gouy balance technique?
- Answer questions 1-3 from the end of the handout.
- Cite all references used.

3 Calculations and Results

[30] This section should include a sample calculation for each of the quantities that you calculate based upon the calculations that are outlined in the handout. Your work should be clearly labeled, easy to follow and start with raw data or results of a shown calculation. Calculations include:

- The apparatus constant using several different approaches.
- The maximum magnetic field strength.
- The magnetic susceptibility in several different forms (molar, mass, etc.)
- The effective magnetic moment.
- Predicted number of unpaired electrons in strong and weak fields.
- Total spin angular momentum, total orbital angular momentum and total angular momentum.
- Comparison to the literature values for experimentally determined quantities.
- Error analysis must be included.

The results of the calculations including error analysis for all of the solutions studied as well as the theoretical calculations should be tabulated and clearly labeled. If you did Part II, include the required plots (discussion question 4 of the from the handout)

4 Discussion

[6] Interpretation of the results.

- Answer discussion question 4.
- Compare your results to theoretical results and discuss their validity.

Note: This is not meant to be a complete guide to all of the questions you need to address in the lab report, just an overview of some of the important ones. Refer to the handout for more. Also, refer to the Guide to Written Reports for a good, general overview of how to organize a lab report. Remember, you can organize it however you think is best, but you need to address all of the questions in the handout.

