Chemistry 20L **Spring 2005**

Pre-lab and Post-lab Report Guidelines for Assignment #4 (Titrations and Indicators)

Pre-lab work is due at the beginning of the lab section. Refer to the laboratory syllabus for the due dates of the post-lab report. Pre-lab and post-lab reports MUST be written inside your lab notebook (with the exception of graphs.)

The REVISED PROCEDURES for this experiment are supplemented as a handout. Make sure you read the revised procedures before writing your reports.

Pre-lab Work (Individual)

(I) On-line Technique Video

- Use of a Buret http://oid.ucla.edu/WebCast/Chemistry/Chemistry/Chem-Buret.ram

(II) Prelab Assignment questions

- *Read page 56-58 BEFORE you start working on the study questions.*
- **Complete questions #1 and #2 (see bottom of page 58 & 59):**
- *NOTE: For question 2(b), assume that BOTH protons dissociate completely.*
- *Show ALL your work and reasoning.*

(III) Introductory Report Material (includes questions 3 and 4 on page 59) Be sure to include

- The title of the experiment and date.
- A reference (i.e. complete reference of the experiment including title of the lab manual, author, edition and page number of the experiment in the manual as well as the modification provided in the handout.) Use the procedure described in the handout.
- A short introduction (Summarize in two or three sentences the goals of the experiment. Outline the kinds of techniques that you will use in the experiment)
- A brief flow chart summary of the key procedures of the experiment
- MSDS information for Sulfuric Acid (0.2 N or 0.1M)
- data tables for each titration. Include columns for buret volume reading, pH, and color of the solution. Be sure to leave an entry for recording the initial conditions and buret volume reading. *Note: Start a NEW page in your notebook for this section. The previous material will be turned in at the beginning of the period; this page will be turned in at the end of the lab period*

Post-lab Work – (This is a GROUP report)

Data Analysis and Discussion

- Identify the name of each group member as well as the individual responsibility each had when performing the experiment and writing the report
- Organize the titration data into a coherent format. This may require that you prepare another data table that summarizes all the titrations that your group collected during the lab period. For each titration, record in your postlab report whose notebook contains the original data.
- Calculate the normality (normal concentration) of the sulfuric acid for **EACH** indicator based on the volume of titrant added at the *end point* of the titration for that indicator **Show ALL your work and reasoning. (refer to lecture notes from 4/21 for calculations of normality in titrations.)**
- Assuming that the correct indicator for this experiment is bromocresol green, calculate the % deviation for the concentration of the sulfuric acid for the other two indicators. Show ALL your work. *Note: % deviation is NOT the same as % RAD or % RSD.*

Error Analysis

- Calculate the % inherent error in the concentration of sulfuric acid for **EACH** of the titrations. Show all your work. *Assume that EACH indicator contributes an additional 0.05 mL to the titrant volume error. Hint: Your post-lab report #2 will be a good source of reference on how to compute inherent errors.*
- What can you conclude about the % inherent error in relation to the choice of the indicators?

Discussion

- Assuming that bromocresol green is the correct indicator for the titration of sulfuric acid and the base you used, what can you conclude about the pH at the equivalence point? Write equations to describe the nature of the species present in the solution at the equivalence point.

Conclusion

- Summarize your results of the determinations of the normality of the sulfuric acid for **EACH** titration.
- Summarize the %deviation for the concentrations of the sulfuric acid when phenolphthalein and methyl orange were used to determine the end point of the titration.