

Experiment #11: Analysis of Iron oxalate Complex (PART 2)
REDOX Titration Analysis of Iron Oxalate Complex

IMPORTANT: Make sure that you follow the proper laboratory safety protocol (refer to the course syllabus) BEFORE going to the lab. You will be dismissed from the laboratory if you do not follow the proper safety protocol.

Pre-lab Report Guidelines

- (i) Title
- (ii) Reference of procedures
- (iii) Introduction - summarize the goal(s) for this part of the experiment as well as any techniques (including any synthetic; analytical and/or purification techniques) that you will be using in achieving such goal(s).
- (iv) Procedures in flowchart format (refer to p. 101 under period 2 BUT NOT INCLUDING "Colorimetric Analysis of Iron". You will complete the flowchart for the colorimetric analysis in PART 3 of the pre-lab report)
- (v) MSDS information

The following chemicals will require you to use the MSDS database on the Web:

Potassium permanganate (0.05 to 0.15M)

Note: In MSDS, select the site that gives you the MSDS information CLOSEST to the concentration listed above for each individual chemical.

You should record the following MSDS information in your notebook for the chemicals listed above.

(Printouts directly from the Web pages will NOT be accepted!!)

- (a) Product Name
- (b) Chemical Formula
- (c) Formula Weight
- (d) Melting Point; Boiling Point and Density (i.e. specific gravity)
- (e) Health Hazard Data (**summarize in your own words**)
- (f) Spill and Disposal procedures (**summarize in your own words**)

(vi) Pre-lab study questions (**Must show all work for FULL credit**)

Complete ONLY questions 1 and 2 under period 2 on p.99. For question 2, the hint is that *one mole of metal ion combine with only one mole of EDTA.*

(vii) Data/observations (start a **NEW** page for this section)

Set up tables but leave blank. You **MUST** record all the observations into your lab notebook during your lab sessions.

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Post-lab Report Guidelines

This is an INDIVIDUAL Report

Refer to the post-lab due date listed on the lab schedule

(A) Abstract (refer to PART 1 post-lab guideline on what to include in the abstract section of this part of the report)

(B) Titration Data (see p.103 under Analyses)

- (i) Orderly record (i.e. recopy) of your own titration data
- (ii) Data tables should have proper titles/labels

(C) Data Analysis (MUST SHOW ALL WORK FOR FULL CREDIT)

- (i) Calculate the moles of oxalate for each of your titrations, based on the stoichiometry of equation 3, p. 98
- (ii) Calculate the moles of oxalate/gram of product for each of your titration

(D) Error Analysis (MUST SHOW ALL WORK FOR FULL CREDIT)

Absolute uncertainties for various types of laboratory equipment are listed on page 31 of your lab manual

- (i) Calculate the % inherent error for the moles of oxalate/ gram of sample for **ONE** of your titration trial. Note: Concepts on how to calculate %inherent error were discussed extensively in Chem 20L.
- (ii) Calculate the % RAD (refer to page 22-25 for definitions) for the moles of oxalate/gram of sample that you obtained from your own titration trials.

Note: If there is no % relative error (or absolute error) given on the bottle of potassium permanganate solution, you may assume the % RELATIVE error in the stock potassium permanganate solution to be $\pm 1\%$.

(E) Conclusions

- (i) Summarize results
- (ii) Compare % RAD with the % inherent error. What can you conclude? Explain.
- (iii) Using the UV spectrum of the iron-oxalate complex, explain whether the maximum absorption occurs at the "expected" wavelength.