

Chemistry 1212K Lab
Spring Semester 2014

CRN 10239 & 14835

PreLab Lecture: Tuesday 2:00 pm – 2:45 pm, 362 Petit Science Center

Laboratory: Tuesday 2:45 pm – 5:00 pm, 355 Petit Science Center

Instructor: Dr. Nilmi Fernando When sending emails, please use your official
211 Courtland North GSU email account and put the course name
(404)-413-6003 (Chem 1212 lab) in the subject line.
nfernando1@gsu.edu

Office Hours: Friday: 10:30 am- 12:00 pm.

Other appointment times can be scheduled if needed.

Text: GSU Lab manual (to be handed out at first lab lecture; cost included in lab fees).

A course outline, schedule of activities (p.8-11), grading (p.6) is included in the lab manual.

Learning Outcomes:

Course will focus on reinforcing concepts and stoichiometric calculations from Chem 1211 and 1212 lectures. The students will synthesize a compound containing Cobalt, NH_3 and halide (Cl^- or Br^-). Then QUANTITATIVE ANALYSIS is done to determine some properties of this compound and determine the formula of the product. This involves precipitation reactions, acid-base titrations, redox titrations, and stoichiometric calculations to find the mass % of each element in the compound. Students will also learn how to prepare solutions of known concentration, and the proper handling and disposal of acids, bases and other common chemicals.

Lab Policies:

1. This lab is an individualized project-oriented lab, which includes synthesizing a compound, analyzing its composition, calculating and reporting results, doing error analysis, identifying the compound, and explaining how the data obtained leads to the selected identity of the compound. Students will work independently in lab and report their own results.
2. Lab notebook for in-lab experimentals and data should be kept up to date. **Stitched, bound notebook required.** Leave the first two pages of the notebook blank for Table of Contents. All pages must be numbered, dated and initialed at the top right corner. All data must be recorded in ink. Do not tear out pages, or whiteout/markout data. Instead cross-out the incorrect data and present corrected data on another blank page. Notebooks must be signed by TA's or lab instructor at conclusion of lab.

Before lab each week, students are responsible to READ lab manual and WRITE in their lab notebooks information about each experiment in advance of lab (schedule at end of syllabus).

At the start of each experiment before you can begin any labwork, your lab notebook must have a summary of the experiment in your own words including (i) purpose, (ii) materials, (iii) experimental methods (bullet points). TAs will check notebooks before entering lab, and students without written notes in their notebook, will NOT be allowed to enter the lab. During lab students are expected to record data in INK directly into their notebook. **Data must NEVER be recorded in pencil or on other books/papers and later transferred to the notebook.**

3. A separate notebook is required for pre-lab notes. Take notes in this notebook during pre-lab lecture, including example calculations done on the board.
4. Quizzes may be announced or unannounced and will be closed book. **No makeup quizzes given.**
5. **Safety glasses or goggles, an apron and gloves are required to be worn at all times inside the lab.**
6. Dress appropriately. Students will not be allowed to enter the lab without appropriate clothing.
 - (i) No open-toed shoes (flip-flops, sandals, crocks, etc.)
 - (ii) No shorts or short skirts. Legs must be covered.
 - (iii) No sleeveless shirts/tops. Shoulders must be covered. Long sleeves advised. Use lab aprons.
7. **The preparation/handling of concentrated acid or ammonia solutions must be carried out under the hood. All experiments (except titrations) must be done in the hood.** Students must handle all chemicals safely and dispose of them in appropriate waste containers.
8. **Cleaning up is part of the lab session.** Students should stop working and begin cleaning up their work area, including their hood space, 30 minutes before the conclusion of the lab session. Return all checked out items to TA at least 20 minutes before the end of lab (by 4:40 pm). **Students must EXIT the lab by 5:00 pm.** Points will be deducted if work area is left messy. Students need to put away all individual glassware and supplies in their locked drawer before leaving lab. Items left out on counters will be taken up and students will be charged for missing items at end of semester.
9. **No food or drink allowed in the lab.** This includes chewing gum and candy. Put all food/drink away inside your book bag. Bags, coats, umbrellas, etc are to be stored in the compartments by the door; these items are not allowed on the floor, chairs or lab counters. **Failure to follow safety rules will result in expulsion from the lab with no make-up allowed.**
10. **Students must turn in reports on all calculations and data sheets (in ink) at the completion of each experiment** (p.71-83 of the lab manual, due dates below). Calculations with correct significant figures and units must be included for full points. Points will be deducted for late submissions, which are only allowed up to one week after the due date. Graded data sheets will not be returned to students, and will not be accepted at the end of the semester. Typed final **data tables** and **sample calculations** must be included in the final lab report, including p. 67 (summary data sheet).
11. Make-up labs are not allowed, unless the student has a legitimate excuse for missing a lab. A student can make-up only one lab for such reason provided documentation for proof. Make-up labs start after March 04th, 2014 and will need a written authorization from the instructor. Students are responsible for completing all lab work during the allotted time frame.

To pass the lab: students MUST (1) **take the written lab final exam**, (2) **turn in a final lab report**, and (3) **turn in their lab notebook**. All this is **due on April 22nd, 2014** (during week 13) at the beginning of prelab lecture. It is important that students work on their lab report as experiments progress during the semester. Grading scheme is given on p. 56 of lab manual. Lab report directions are given on p. 62 – 66 of lab manual. The final lab report cannot be written in one night.

First Session: Safety, check-in, crucibles weight experiment (pages 69 & 71 of the lab manual) Students should transfer data recorded on page 69 of the lab manual to the lab notebook, following the table of contents pages. This experiment must be dated (at top right), and a similar format should be used for the rest of the experiments to be performed during the semester.

Sessions 2 through 12: Preparation and determination of the formula for a cobalt-amino-halide complex and determination of unknown concentration and mass percentages.

Session 13 Final exam and check out. Final report (including the table on page 67 of the lab manual) and lab notebook due at this time. Graded lab notebooks may be picked up from the lab instructor in the first week of the following semester, after which time they may be discarded. Graded final exams and final reports can be viewed in the instructor's office but will not be returned to the students. **No grades will be given via e-mail or by phone.**

SCHEDULE OF EXPERIMENTS

Spring Semester 2014

CRN 10239 & 14835

Tuesdays 2:00 pm – 5:00 pm, 362 & 355 Petit Science Center Dr. Fernando (nfernando1@gsu.edu)

DATE	WEEK	CHEM 1212 LAB EXPERIMENTS
Jan 21	W1	Check-in, Safety Video, Desks & Synthesis assigned. Review safety procedures and equipment use. Obtain constant weight of 2 Gooch crucibles (weigh on analytical balance, heat 30mins in oven, cool 20 min. in desiccator), do not touch with bare hands. Record Balance number. Review Buret & Analytical Balance use.
Jan 28	W2	<u>Start Synthesis of Co-aquo-NH₃-halide (Cl⁻ or Br⁻)</u> (assigned by instructor). Also reweigh crucible, heat, then cool in desiccator. Want constant weight +/- 0.0005 grams.
Feb 4	W3	Complete Synthesis of Co-aquo-NH ₃ -halide (Cl ⁻ or Br ⁻). Reweigh crucible, heat, cool & reweigh. Want constant weight +/- 0.0005 grams.
Feb 11	W4	<u>Precipitation of Halide</u> . Determination of %Cl ⁻ or %Br ⁻ in synthesized compound. - <i>Submit % yield & color for synthesized compound.</i>
Feb 18	W5	Complete second precipitation of Chloride or Bromide and calculate % halide. - <i>Submit "Crucible Weight" Data Sheet (p. 71).</i>
Feb 25	W6	Prepare ~0.3M HCl solution. Titrate with primary standard THAM to <u>standardize HCl</u> . - <i>Submit "Preliminary %Halide "Data Sheet (p. 73).</i>
Mar 4		Last day to withdraw (from BOTH lab and lecture)
Mar 4	W7	<u>Distillation of NH₃</u> into boric acid solution in the hood and titration of NH ₃ with standardized HCl. (BOTH the distillation and the acid-base titration must be carried out in SAME lab session). Calculate %NH ₃ in synthesized compound. - <i>Submit "Preliminary HCl Molarity" Data Sheet (p. 75).</i>
Mar 11	W 8	Continue Distillation and titration of NH ₃ two more times. <u>Determine %NH₃</u>
Mar 17	-21	Spring Break
Mar 25	W 9	Preparation of Na ₂ S ₂ O ₃ and titration with KIO ₃ to <u>standardize Na₂S₂O₃</u> . - <i>Submit "Preliminary Report on %NH₃" Data Sheet (p. 77).</i>
Apr 1	W10	<u>Redox titration</u> of synthesized compound <u>with Na₂S₂O₃</u> to determine % Co. - <i>Submit "Preliminary Report on Standardization Na₂S₂O₃"Data Sheet (p. 79).</i>
Apr 8	W11	<u>Analysis of H₂O₂</u> using Na ₂ S ₂ O ₃ . - <i>Submit "Preliminary Report on %Co" Data Sheet (p. 81).</i>
Apr 15	W12	<u>Make-up Lab</u> , Clean-up and Checkout. - <i>Submit "Preliminary Report on %H₂O₂" Data Sheet (p. 83).</i>
Apr 22	W13	<u>Take Final Exam, Submit Lab Notebook and Final Lab Report</u> (<i>including summary data sheet p. 67</i>). Clean-up & Checkout.

CHEMISTRY 1212K Lab

Spring 2014

CRN 10239 & 14835

Tuesdays 2:00 pm – 5:00 pm, 362 & 355 Petit Science Center Dr. Fernando (nfernando1@gsu.edu)

I have read the entire syllabus and understand the grading system and agree to abide by the course policies and all the additional information provided in it, including the following:

1. **No make-up tests or quizzes** will be given.
2. Students need to show their GSU Panther I.D. card when taking exams and quizzes.
3. The instructor reserves the right to assign seating during exams and quizzes.
4. Cell-phone calculators and programmable calculators are not allowed.
5. Cell-phones need to be kept either in purses or book-bags during exams or quizzes, and should be turned off at all times.
6. **The preparation/handling of concentrated acid or ammonia solutions must be carried out under the hood.** Unused concentrated acid or ammonia solutions must be diluted by adding them to water, under the hood. The amount of water to be used in the dilution depends on the amount of reagent needed to be diluted so it will not fume (about 1 in10 dilution). The diluted solutions will be discarded in the waste drum located in the lab. Glassware used for the preparation/handling of concentrated acid or ammonia solutions must be rinsed with enough water, under the hood, and the combined rinses must then be placed in the waste drum.
7. **Failure to come prepared to lab (with purpose, procedure and blank data tables)** will result in the student sitting outside the lab, and writing this material in the notebook before being allowed to enter the lab. Failure to follow safety procedures will result in expulsion from the lab, with no opportunity to do makeup labs and with a loss of credit.
8. **Preliminary reports on all calculations, in ink, must be submitted at the time of the completion of each experiment** (due dates in syllabus), and a typed version must be included in the appendix section of the final report; otherwise, you will be assigned the minimum amount of points for those experiments not submitted (if you have supporting data in your lab notebook). Preliminary report forms are found in the last pages of the lab manual, one for each experiment needing calculations. **For full points show sample calculations with correct significant figures and units.**
9. **The clock schedule for the lab must be followed.** Students are not to enter occupied labs before the scheduled start time of the lab itself. *For each scheduled lab section, clean-up must be completed by the end time of the lab so as not to disrupt the next class.*
10. **Make-up lab policies are posted** on the door outside the lab, and will only be allowed after March 4th, 2014 **only** if space is available. A written authorization from your lab instructor is required.

Name (print in ink): _____

Signature (in ink): _____

Date: _____