

I. Instructions for different Labs are on Moodle. Students should bring hard copy of lab procedure to class.

II. Students need to use lab notebook for recording data –in duplicate of records (“copy Tear Sheet”). A Dated & Signed (by instructor) Notebook Page (copy) **needs to be handed in with each Report.**

III. Reports due as scheduled on Expt sheet. Reports later than scheduled due date lose 15% of grade. Reports later than 2 weeks after scheduled due date lose 30% of available pts.

IV. Experiment List (In Reports, please refer to experiments by name rather than number).

There are 3 Preliminary Experiments (60 – 100) Points – Individual experiments, Individual reports

- (i.) THERM Thermochemical parameters Enthalpy Entropy Heat Capacity (T) / Intro to Group Additivity,
- (ii.) Volume / Mass Measurements and Required Statistical Analysis of Error - 95% Confidence limits.
- (iii.) Standard Work Curve - Make, Measure Abs & Plot - Three Accurately Known Concentrations vs. Absorption demonstration of lab techniques.

There are 7 Phys/Anal-Chem Experiments -> Group Experiment (100 points / Expt)

Expt (ID) Groups of 2 Group Experiments

CC (1) Combustion (bomb) Calorimetry (Each Group will have one different Compound)

SC (2) Solution Calorimetry

Vp Vap (3) Vapor Pressure Liquids; Enthalpy of Vaporization

KCat (4a) Catalyst Synthesis and Kinetics: Organic Pollutant Degradation in Wastewater by Catalyst plus Sodium Percarbonate (Tooth Whitener) Supported Metal Catalyst by student.

KCat (4b) As Cat 4a -Substitute Bicarbonate Activated Hydrogen Peroxide for Sodium Per-Carbonate. See Separate write up

MR 5 Acid Dissociation Constant of Methyl Red

SL 6 Phase Diagram of a Binary Solid-Liquid System

Kin-Ls Kinetics –7 Oxidation of Dyes by Hypochlorous acid (HOCl, Bleach) Laser Absorption

KA 8 Kinetics: Hydrolysis of Methyl Acetate

KBr 9 Kinetics: Bromination of Acetone

Hv 10 Photochemical Cell- Construct / Test of Dye Solar Cell – Test Silicon Solar Cell-Light to Energy

Ec 11 Conductance of Strong and Weak Electrolytes

Liq-Vap LV 11b Liquid Vapor Phase Diagram

CO2 Calibrate Flow Meter / Measurement of CO₂ in Ambient Air

Common Experiments Chem 339 100 pts each (Group Experiments)

Titrate 12 Potentiometric Titration of an acid mixture

Co-Ni 13 Spectrophotometry of a two component mixture

Pb 14 Analysis of Lead Pb, in an air pollution sample

Individual Experiment, Individual Reports

**TK ThermoChemical Kinetics 15 Computational Thermochemistry and Kinetics
Kinetics via Conductivity - not currently available**

Weeks	Lab Dates Week	locker #	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10	<p>Dates Hard copies of Lab Report(s) Due Wednesdays 1.5 weeks following Completion of Expt.</p> <p>Submit In Lab class or in Chem Office 151 T (Bozzelli – mail bin)</p> <p>Subject to change</p>		
			EXPERIMENTS												
1	09/ 09		All Groups – Check-in, Preliminary Experiments (i.) (ii.) and (iii.)										<i>Estimated dates Chem. 339</i> 09/ 14 to 09/21		
2-3	09 / 16-23		Expt. –Titration 1.5 weeks									titr	CC	CC	Expts (iii) Std Curve, (ii) Vol + Error
3-4	09 /23-30		Expt 13 Co-Ni 1.5 weeks									CoNi	Vap	KinLs	Expts – (i) Therm / Titrate
5-6	10 / 07-14		CC	KBr	Liq Vap	Vp	CC	Kcat	MR	Kin- Ls	SC	Vap	Experiment Co-NI		
7-8	10 / 21-28		Vp	CC	Hv	K- LS	Kcat	CC	CC	SC	Hv	MR	Week 6-7 Experiment		
9-10	11 / 04-11		K- Cat	Vap	CC	CC	MR	Vap	Liq vap	Hv	Kin- Ls	Hv	Week 8-9 Experiment		
12	11/18		CO ₂ Measure in Air – 1 collection set – 2 Analysis Methods 1 Lab period										Week 10 Experiment		
13	12/02		Experiment 15 Computational Chemistry Thermochemistry for Equilibria and Kinetics										Week 12 Experiment		
14	12/09		Oral Presentation of one Experiment. (If presentation is last experiment, you can submit ppt file in place of written report										Computational Chemistry Experiment		
15	12/16		Oral Presentations Continue if Needed										Presentation Materials (ppts) due following presentation		

VI. Total: 6 (1 – 2)-week experiments + 1 thermo/Computational Chem + 3 Preliminary Experiments. Selection of experiments is determined by availability of equipment and is at the discretion of the Instructor.

***** Groups of three need to perform 1.5 times the number of runs each expt that groups of two do.**

VII. Reports:

- Preliminary Experiments (i), (ii), (iii), Individual reports (Outline format – Short Report + Graph)
- Experiments 1-14, on Group II Expts (Formal Report Per “Lab Report Info” on Moodle)
- Experiment 15, Individual / Calculations, Calculation Results / Recommendations.
- Reports (Abstract, Objective, Method, Data, Results, Discussion, Error Analysis, Summary.
- Oral Presentation on one of Last 6 Experiments – If Recent Expt → PPT File Serves as Report.

VIII. LAB REPORT GRADING

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SECTION	MAX SCORE
Abstract	required*
Introduction / Objective	required
Experimental Procedure	required*
Theory	required
Results – Experiment	required*
Results – Calculation / Interpretation	required*
Discussion - reasons for error can be here.	required
Error Analysis - this is not a discussion.	required*
Summary	required
Lab Notebook sheets with report write up.	required
Hard copy of Lab Expt Instructions in lab.	6 pts
TOTAL points (* Important)	100

Grading - 50 pts for doing the experiment well - 50 pts for work up of data – interpretation.

**Students who miss One Lab out of a two Lab Expt will receive 25 points max, for Experiment Part;
Unless they make up the Expt. Part.**

Chem 339 and Chem 235A

Oral presentations are a required component of this lab course. Each student group / all students.

The Oral Presentation can be on the last lab experiment performed in the lab or on Thermochemical Kinetics.

If one of the Last Two labs is presented – the presentation and grade serves as the lab report - no further report due; but a copy of the ppt file needs to be submitted (hard copy or email).

Note in the thermochemical kinetics, each student has a different molecule.

If the oral presentation is on one of the other earlier experiments then a lab report is due for the last experiment as well as the earlier experiment.

The Oral report cannot be on any of the first lab period experiments (std solution, # drops in milliliter - statistical analysis or group additivity for organic molecules) and cannot be on the Multi Acid Titration.