

Chemistry 821

Electroanalytical Chemistry

Fall 2010

- Lectures:** MWF 12:30 – 1:18 pm
McPherson Chemical Laboratory (MP) 1008
- Instructor:** Dr. Anne Co
co@chemistry.ohio-state.edu
MP3033E
- Teaching Assistant:** Tian Lu
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MP 3005
- Office Hours:** by appointment
- Prerequisites:** Chemistry 532 (Thermodynamic equilibrium and chemical kinetics)
or permission from instructor.
- Course evaluation:** Final grades for the course will be determined as follows
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| Problem sets | 10% |
| Midterm Exam 1 (Oct 15 FRI) | 30% |
| Midterm Exam 2 (Nov 12 FRI) | 30% |
| Final Exam (Dec 6 MON 11:20am – 1:18pm) | 30% |
- Course homepage:** <https://carmen.osu.edu/>
Problem sets, supplemental reading materials (including selected articles and book chapters) in electronic form can be found in the course homepage
- Reading material:** There is no required text book for this course. Topics covered in class will be selected from the from the following textbooks
- [John O'M. Bockris, Amulya K.N. Reddy, Maria E. Gamboa-Aldeco
Modern Electrochemistry 2A: Fundamentals of Electrodeics](#)
- John O'M. Bockris and Amulya K.N. Reddy
Modern Electrochemistry 2B: Electrodeics in Chemistry, Engineering, Biology and Environmental Science
- Larry R. Faulkner
Electrochemical Methods: Fundamentals and Applications

Tentative Schedule

Week of		Topic
1	Sept 22 W	Background, Review of undergraduate materials
Part 1: Overview of fundamental aspects of electrochemistry		
	Sept 24 F	Electrode potential, measurement of potentials, polarized and non-polarized
2	Sept 27 M	electrodes, reference electrodes, structure of the electrical double layer
	Sept 29 W	
	Oct 1 F	
3	Oct 4 M	Current/voltage relationship based on mass-transfer and activation controlled
	Oct 6 W	reactions, Butler-Volmer relationship, Tafel plots, electrode kinetics at the
	Oct 8 F	interface, mechanisms of electrochemical reactions
4	Oct 11 M	
	Oct 13 W	
	Oct 15 F	Mid term Exam 1
Part 2: Evaluation techniques		
5	Oct 18 M	Potentiostat overview, DC methods, voltammograms, chronoamperometric,
	Oct 20 W	chronopotentiometric methods
	Oct 22 F	
6	Oct 25 M	AC methods, electrochemical impedance spectroscopy
	Oct 27 W	rotating disc and ring-disc electrodes
	Oct 29 F	
7	Nov 1 M	
	Nov 3 W	Other methods for probing electrode/electrolyte interface (scanning probe
	Nov 5 F	techniques, spectroscopic methods)
8	Nov 8 M	Brief overview of surface characterization methods
	Nov 10 W	
	Nov 12 F	Mid term Exam 2
Part 3: Electrochemical Processes		
9	Nov 15 M	Selected topics in electrochemical basis of corrosion, pourbaix diagrams, Evans
	Nov 17 W	diagrams
	Nov 19 F	Selected topics in fuel cells
10	Nov 22 M	Selected topics in batteries
	Nov 24 W	
	Nov 26 F	Thanksgiving (no classes)
11	Nov 29 M	
	Dec 1 W	Selected topics in electrolysis and other industrial electrochemical processes
	Dec 3 F	Review
12	Dec 6 M	Final Examination (11:30 am - 1:18 pm)