

CHM 511: Advanced Analytical Chemistry I Spring Term, 2020

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Lecture: T/TH, 11:00 am-12:15pm

Room 215, Beaupre, or online class during the emergent season for COVID 19. The online link will be posted in the Sakai for each class.

Text: Electrochemical Methods, 2nd Ed., by A. J. Bard and L. R. Faulkner
John Wiley & Sons, Inc., 2001.

Goals: To understand the fundamental of electrochemistry and the application of electrochemical methods to chemical problems with emphasis on quantitative interpretation of electrochemical results. Note that topics such as electron transfer reaction, interfacial structure, interfacial potential, and diffusion process, which are repeatedly discussed in this course, are important in many scientific fields.

Topics: **(Topics could be adjusted depending on the schedule)**

1. Introduction and Overview of Electrochemical Methods (Ch. 1)
2. Potentials and Cell Thermodynamics (Ch. 2)
3. Kinetics of Electrode Reactions (Ch. 3)
4. Mass Transfer (Ch. 4)
5. Controlled Potential Methods (Ch. 5)
6. Linear Sweep and Cyclic Voltammetry (Ch. 6)
7. Double Layer Structure and Adsorption (Ch. 13)
8. Electroactive Layers and Modified Electrodes (Ch. 14)
9. Analysis of Electrode Reaction Mechanisms (Ch. 12)
10. Ultramicroelectrodes and SECM (Ch. 16)
11. Stochastic nanoelectrochemistry (if schedule is available)

Examination: **A take-home midterm examination (150 point) will be scheduled in late March or early April (actual operation for COMSOL Multiphysics (simulation software) will be canceled due to the COVID 19). A final examination (150 point) will be given in Beaupre 215 at 8-11 am on Apr 30th under the normal schedule. Depending on the situation related with COVID 19, a final exam can be replaced with a take-home exam.**

Problem Sets: Some problems at the end of each chapter in the textbook will be assigned during the course, and posted on the Sakai. **Under the normal situation, they will be collected and graded. Depending on the situation related with COVID 19, photocopy will be collected by email (4 times, each 15~60 points).**