CHENE4235: Surface Reactions and Kinetics

Instructor: Jingguang Chen (jgchen@columbia.edu)

Textbook: Principles of Adsorption and Reaction on Solid Surfaces, Richard I Masel, Wiley Series in Chemical Engineering, 1996, Wiley and Sons; **& Class Handouts**

Jan. 12, 14	Nomenclature and definition of surface structures. Mathematical methods in converting surface structures between real and reciprocal spaces.
Jan. 19, 21	Principles of experimental techniques in characterizing surface structures.
Jan. 26, 28	Kinetics and thermodynamics of adsorption on surfaces.
Feb. 2, 4, 9	Kinetics and thermodynamics of chemical reactions on surfaces; Principles and application of experimental techniques in characterizing surface reactions and intermediates
Feb. 11	**Midterm 1**
Feb. 16	Guest lecture: density functional theory (DFT).
Feb. 18, 23, 25	Kinetics and thermodynamics of desorption from surfaces. Temperature programmed desorption.
Mar. 2, 4	**No class; Spring Break**
Mar. 9, 11	Surface kinetic modeling of adsorption, reaction, and desorption processes.
Mar. 16	**Midterm 2**
Mar. 18	Correlating kinetics and thermodynamics.
Mar. 23, 25, 30	Effect of surface electronic structures on kinetics.
April 1, 6, 8, 13	Transport effects on kinetics.
April 15	Class overview.
April 20	**Final Exam**

Overall Course Grade
HW: 10%; Midterm 1: 30%; Midterm 2: 30%; Final: 30%