

ENGN 2770 – Fall 2013

Catalyst Design & Atomistic Reaction Engineering

Brown University School of Engineering

Instructor: Andrew Peterson, andrew_peterson@brown.edu, B&H 247.

Textbook: *Concepts of Modern Catalysis and Kinetics*, Ib Chorkendorff and J.W.

Niemantsverdriet (2007, second edition). Wiley-VCH. Available through the bookstore or as an e-book through the Brown University Library.

Lectures: Tuesday & Thursday, 13:00 – 14:20. Barus & Holley 751.

This course covers the principles of operation of heterogeneous catalysis and advanced reaction engineering with an emphasis on catalysis theory. Includes electronic structure calculations, linear scaling relations, free energy relations, surface reactivity, rate theory, and electrocatalytic concepts. Applications of study in this course will focus on catalysts for energy conversion.

This course is intended for students who are interested in the engineering of chemical reactions from the atomic scale. It is recommended that the interested student take ENGN 1120 (chemical reaction design) or similar, and a strong background in thermodynamics is required. Experience in quantum and statistical mechanics is useful, but not necessary. Suitable for graduate students and advanced undergraduates.

