



The Chemical and Biomolecular Engineering Department

UNIVERSITY OF HOUSTON

A Short Course

APPLICATIONS OF HETEROGENEOUS CATALYSIS
May 25-29, 2009

Course Directors

Professor J. T. Richardson
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Professor Dan Luss
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We are pleased to announce the next presentation of our short course "Applications of Heterogeneous Catalysis" for May 25-29, 2009. The course is organized to match the needs of chemists and chemical engineers entering the practice of heterogeneous catalysis. However, it is equally suited to individuals experienced in certain areas but who wish to acquire an overview of the field. We do not emphasize research methodology but concentrate on applications to real problems.

The course has been given sixty times in Houston since 1971, fifteen times at various locations in Europe, and adapted many times for in-house courses at major companies. Many companies routinely send their personnel to us for training, a fact that testifies to the success of the course.

Course Description

Successful applications of the principles of catalysis to process design require a combination of physics, chemistry and engineering, together with considerable state-of-the-art "know-how". Contemporary catalysis has made significant progress in recent years toward the scientific design of optimum catalyst systems for specific process requirements. The purpose of this course is to cover current knowledge for both the researcher in catalysis and the engineer interested in process optimization. It will serve as a review for those knowledgeable in the subject and as an introduction to newcomers to the field.

The course covers how to

- select,
- prepare,
- characterize,
- test, and
- use a catalyst.

The nature of catalytic components, such as supports, active materials and promoters, is discussed in detail from the perspective of process applications. Prediction of catalytic properties and design of specific systems are treated with reference to modern theories of catalysis and the correlations of kinetic properties. Guidelines for selecting potential catalytic "candidates" for target processes are given. Laboratory and commercial methods of catalyst preparation are reviewed, with emphasis on proven process catalysts.

Modern instrumental methods for the characterization of catalyst physical and chemical properties are covered, especially techniques for measurement of surface areas, pore properties, diffusivities, crystallite sizes, acidities, etc. Catalytic kinetics, both chemical and diffusional are considered, and the relationship of surface mechanisms to catalyst properties fully outlined.

The course then treats the design and construction of experimental reactors used to test catalytic properties, together with techniques for modeling process reactors. Included are catalyst deactivation and regeneration.

Finally, several case histories are used to demonstrate how laboratory catalysts are scaled-up to industrial processes. Critical aspects are emphasized, such as modeling, parametric sensitivity, stability and regeneration.

Fee

The registration fee is \$1,250, which includes a complete set of notes, coffee breaks, and an introductory lunch. Payment may be made with a personal (or company check), credit card or we can send an invoice.

Registration

Please contact Ms. Pat Cooks, Department of Chemical Engineering, University of Houston (phone: 713 743 4300; fax: 713 743 4323; e-mail: patcooks@uh.edu) or the co-directors for registration information. The deadline is May 18, 2009, with the registration fee paid in full. No cancellations will be accepted after May 18, 2009, but registrants may send substitutes or defer attendance to the next scheduled course.

Location

The course will be given in room S102D in the Cullen College of Engineering. Instructions for transportation to the University of Houston and to the College will be sent to registrants.

Hotel accommodations

Hotel accommodation is available at the University Hilton Hotel on campus for a rate of \$119/night plus tax. Details will be sent to registrants. Recommendations for other local hotels with arranged discounts will be mailed on request.

Schedule

Monday, May 25

9 a.m. Introduction to catalysis	J. T. Richardson
2 p.m. Adsorption and kinetics	J. W. Hightower

Tuesday, May 26

9 a.m. Diffusion in catalysis	D. Luss
2 p.m. Catalytic materials – supports	J. T. Richardson

Wednesday, May 27

9 a.m. Catalytic materials – active components	J. T. Richardson
2 p.m. Catalyst deactivation	D. Luss

Thursday, May 28

9 a.m. Catalyst characterization	J. W. Hightower
2 p.m. Reactor modeling	D. Luss

Friday, May 29

9 a.m. Industrial catalytic processes	V. W. Weekman, Jr.
2 p.m. Examples of catalytic process development	V. W. Weekman, Jr.

Lecturers

James T. Richardson, Ph.D. (Rice University)

Professor of Chemical and Biomolecular Engineering, University of Houston

Dr. Richardson has been with the University of Houston since 1969, following 13 years with Exxon Research and Engineering. His specialties include design of catalytic materials and processes. He is past chairman and cofounder of the S. W. Catalysis Society, an active consultant to the petroleum and gas industry, and author of a popular book, "Principles of Catalyst Development".

Joe W. Hightower, Ph.D. (Johns Hopkins)

Emeritus Professor of Chemical and Biomolecular Engineering, Rice University

Dr. Hightower joined Rice University in 1967, after several postdoctoral appointments at leading catalysis centers, and is also past chairman and cofounder of the S. W. Catalysis Society. His principal research interests are catalytic reaction mechanisms and surface phenomena. He was the recipient of the ACS National Award in Petroleum Chemistry and is well-known for his early work on exhaust-control devices.

Dan Luss, Ph.D. (Minnesota)

Cullen Professor of Chemical and Biomolecular Engineering, University of Houston

Dr. Luss joined the University of Houston in 1967 and specializes in chemical reaction engineering. He is a member of the National Academy of Engineering and the recipient of the AIChE Allan P. Colburn, Professional Progress, Wilhelm and Founders Awards and the ASEE Curtis McGraw Award. He is an experienced consultant to industry in reaction-engineering problems.

Vern W. Weekman, Jr., Ph.D. (Purdue)

Industrial Professor of Chemical Engineering, Princeton University

Dr. Weekman is retired from Mobil, where he was Director of the Central Research Laboratories. In 1982 he was recipient of the AIChE Wilhelm Award and received the Amundson Award in Reaction Engineering in 2004. He was elected to the National Academy of Engineering in 1985 and served as president of the AIChE in 1998. He now teaches at Princeton University. His research interests include applied kinetics, catalysis, process simulation and control.

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REGISTRATION FORM
Please complete and return to
PACooks@Central.UH.EDU
prior to May 18, 2009

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____

FAX _____

E-MAIL _____

POSITION _____

HIGHEST DEGREE/MAJOR _____

SPECIAL NEEDS _____

PAYMENT _____ **Personal check** _____ **Company check** _____ **Credit card** _____
Invoice requested _____

HOW DID YOU HEAR ABOUT THIS COURSE?

From my company _____ **From colleagues** _____ **From personal mailing** _____
From UH web site _____ **Other** _____