NEW FROM WILEY

Fundamentals of Industrial Catalytic Processes, 2nd Edition

Calvin H. Bartholomew, Brigham Young University
Robert J. Farrauto, Engelhard Corporation

THE DEFINITIVE ACCOUNT OF INDUSTRIAL CATALYTIC PROCESSES

Fundamentals of Industrial Catalytic Processes, Second Edition is a comprehensive, combination handbook and textbook that presents the definitive account of important catalyst, reactor, and process technologies for catalytic processes practiced in a wide range of industries, including chemical, petroleum, electric utility, food, transportation, and emission-control industries. Integrating science fundamentals necessary to the design and practice of these processes, the book addresses important basic principles of heterogeneous, homogenous, enzymatic and polymer catalysis.

This book consists of two sections treating fundamentals and practice. The first section addresses basic principles underlying the science of catalytic reactions; catalyst materials, properties, preparation and, characterization; reaction engineering; and catalyst deactivation. The second section provides substantial data on process chemistries, reaction kinetics & mechanisms, catalyst chemistry/design, reactor/process design, and catalyst deactivation for important catalytic processes practiced commercially.

Other features include:

• Over 150 tables and 350 figures (including a color inset) providing detailed activity/rate data; descriptions of catalysts, materials, reactors, and experimental/instrumental methods; reaction networks and mechanistic sequences; comparisons of catalyst and process technologies; summaries of catalyst and chemical production; reactor schematics and process flow diagrams, and photos of process catalysts, equipment, and plants
• Stoichiometric equations, enthalpies, rate & equilibrium constants, and operating conditions for important catalytic reactions. Important equations for catalyst and reactor design.
• End-of-chapter exercises including thought-provoking questions and practical design problems; example calculations in most chapters
• Case studies with detailed descriptions of reaction chemistry and of catalyst, reactor and process technologies for more than 30 of the most important commercial processes.
• Descriptions of the chemistry, composition, and structure of commercial catalysts and enzymes; lists of catalyst suppliers, and a chapter on catalysts used in fuel cells
• Authors’ perspectives and projections (based on 65+ years of combined experience) regarding anticipated future developments of catalyst, reactor, and process technologies.
• A glossary of terms and a table of nomenclature to facilitate reader comprehension.

Containing accessible, every-day-useful information on the fundamentals and practice of catalysis, Fundamentals of Industrial Catalytic Processes, Second Edition is an essential resource for students, faculty, researchers, scientists, engineers, and managers working with catalysts or catalytic processes.

ISBN 0-471-45713-2 • $99.95 • 824 pages • Cloth • March 2005

TO ORDER:

US, MEXICO & SOUTH AMERICA
Tel: 1-800-225-5945 • Outside the US: (732) 469-4400
Fax: (732) 302-2300
E-mail: custserv@wiley.com • URL: www.catalog.wiley.com

CANADA
Tel: 1-800-567-4797 • Fax: 1-800-565-6802 • Please add GST.

GERMANY
Tel: (49) 6201 6061 52 • Fax: (49) 6201 6061 84
E-mail: sales-books@wiley-vch.de

ALL OTHERS
Tel: +44 1243 779777 • Fax: +44 1243 843296

Contents

Preface

Part One – Introduction and Fundamentals

Chapter 1 – Catalysis: Introduction and Fundamental Catalytic Phenomena
Chapter 2 – Catalyst Materials, Properties, and Preparation
Chapter 3 – Catalyst Characterization and Selection
Chapter 4 – Reactors, Reactor Design, and Activity Testing
Chapter 5 – Catalyst Deactivation: Causes, Mechanisms, and Treatment

Part Two – Industrial Practice

Chapter 6 – Hydrogen Production and Synthesis Gas Reactions
Chapter 7 – Hydrogenation and Dehydrogenation of Organic Compounds
Chapter 8 – Catalytic Oxidations of Inorganic and Organic Compounds
Chapter 9 – Petroleum Refining and Processing
Chapter 10 – Environmental Catalysis: Mobile Sources
Chapter 11 – Environmental Catalysis: Stationary Sources
Chapter 12 – Homogenous Catalysis, Enzyme Catalysis, and Polymerization Catalysis
Chapter 13 – Fuel Cells: A Path Toward the Hydrogen Economy

Index