

# Essentials of Chemical Reaction Engineering (Prentice Hall International Series in the Physical and Chemical Engineering Sciences)

H. Scott Fogler

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Learn Chemical Reaction Engineering through Reasoning, Not Memorization

Essentials of Chemical Reaction Engineering is the complete, modern introduction to chemical reaction engineering for today's undergraduate students. Starting from the strengths of his classic Elements of Chemical Reaction Engineering, Fourth Edition, in this volume H. Scott Fogler added new material and distilled the essentials for undergraduate students.

Fogler's unique way of presenting the material helps students gain a deep, intuitive understanding of the field's essentials through reasoning, using a CRE algorithm, not memorization. He especially focuses on important new energy and safety issues, ranging from solar and biomass applications to the avoidance of runaway reactions.

Thoroughly classroom tested, this text reflects feedback from hundreds of students at the University of Michigan and other leading universities. It also provides new resources to help students discover how reactors behave in diverse situations—including many realistic, interactive simulations on DVD-ROM.

#### New Coverage Includes

- Greater emphasis on safety: following the recommendations of the
- Chemical Safety Board (CSB), discussion of crucial safety topics, including ammonium nitrate CSTR explosions, case studies of the nitroaniline explosion, and the T2 Laboratories batch reactor runaway
- Solar energy conversions: chemical, thermal, and catalytic water spilling
- Algae production for biomass
- Steady-state nonisothermal reactor design: flow reactors with heat exchange
- Unsteady-state nonisothermal reactor design with case studies of reactor explosions

#### About the DVD-ROM

The DVD contains six additional, graduate-level chapters covering catalyst decay, external diffusion effects on heterogeneous reactions, diffusion and reaction, distribution of residence times for reactors, models for non-ideal reactors, and radial and axial temperature variations in tubular reactions. Extensive additional DVD resources include

- Summary notes, Web modules, additional examples, derivations, audio commentary, and self-tests
- Interactive computer games that review and apply important chapter concepts
- Innovative "Living Example Problems" with Polymath code that can be loaded directly from the DVD so students can play with the solution to get an innate feeling of how reactors operate
- A 15-day trial of Polymath<sup>TM</sup> is included, along with a link to the Fogler Polymath site
- A complete, new AspenTech tutorial, and four complete example problems
- Visual Encyclopedia of Equipment, Reactor Lab, and other intuitive tools

• More than 500 PowerPoint slides of lecture notes

Additional updates, applications, and information are available at www.umich.edu/~essen and www.essentialsofcre.com.



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