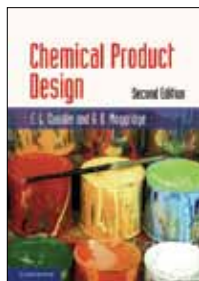




## CHEMICAL PRODUCT DESIGN, 2ND EDITION



**E. L. Cussler and G. D. Moggridge, Cambridge Univ. Press, New York, NY, \$65, 452 pages, May 2011, ISBN: 978-0-521-16822-9**

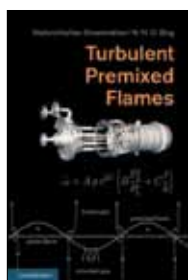
Since its inception, the chemical industry has focused on the manufacture of commodities. Many of today's chemical companies have moved away from commodities to higher-value-added products — distinct from commodities in that they are produced in small quantities, are made of ingredients that cost a fraction of their selling price, and gain value from a molecular or micro structure that gives them better performance.

This revised and expanded edition of a text first published in 2001 documents the changes in the commodity chemicals industry and shows how today's designers of high-value-added chemical products can meet the challenges implied by those changes. The book presents a four-step design template — composed of needs, ideas, selection, and manufacture — that can be applied to virtually any product. The authors strive to help product designers to answer not only the question of how to make a product, but what to make and why.

Later in the book, the template is applied to different types of chemical products. New chapters covering commodities, novel devices, molecules, drugs, and microstructures show how the template can be applied to a wide range of products, including oxygen for emphysema patients, pharmaceuticals like Taxol for chemotherapy, dietary supplements like lutein, beverages, and personal care products. The authors have also expanded the material on economic analysis to emphasize the importance of speed to market.

Beyond its value as a text, the book will be useful to a variety of readers, including those trained in commodity chemicals but now involved with other types of chemicals with higher added value. It should also serve as inspiration for industrial practitioners seeking to promote innovation in their organizations.

## TURBULENT PREMIXED FLAMES



**Nedunchezian Swaminathan and K. N. C. Bray, Cambridge Univ. Press, New York, NY, \$125, 438 pages, April 2011, ISBN: 978-0-521-76969-7**

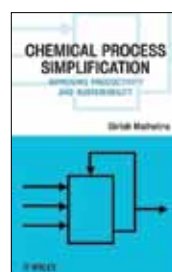
Much attention has been devoted to the environmental impacts of combustion and the search for new combustion concepts and technologies. Fuel-lean combustion in a premixed or partially premixed

mode is a potential route to control emissions and to improve efficiency in both automobile engines and gas turbines. However, this technology is notoriously susceptible to combustion oscillations and requires sophisticated control measures.

This book leads readers to an improved understanding of fuel-lean turbulent premixed flames and their potential to produce ultra-low emission levels. The editors have assembled contributions from an international selection of experts in the field who survey the current modeling approaches for turbulent premixed flames — addressing flame stability, current practices and challenges of fuel-lean combustion in practical devices such as internal combustion engines and gas turbines, future technological and scientific directions, and more. Numerous references are provided for further study.

The book should help readers who are familiar with turbulent premixed combustion to fully appreciate the complexity of the subject and the challenges involved in successfully introducing fuel-lean combustion to practical systems.

## CHEMICAL PROCESS SIMPLIFICATION: IMPROVING PRODUCTIVITY AND SUSTAINABILITY



**Girish Malhotra, John Wiley & Sons, Hoboken, NJ, \$90, 282 pages, Jan. 2011, ISBN: 978-0-470-48754-9**

To compete in the modern economy, companies must deliver the highest-quality product at the lowest cost. Expounding on the author's vision of "increasing profitability through simplicity," this book explains how even the best manufacturing process can be further improved to reduce costs, boost productivity, and enhance product quality and value.

The author presents methods to increase manufacturing efficiencies while also remaining environmentally conscientious. The strategies discussed illustrate how simplifying chemical processes can spur technological innovation and help small- to large-scale industrial plants discover novel ways to improve overall product quality.

The book promotes a structured approach to process development that improves yield and shortens product development and commercialization time, and includes information on topics such as waste reduction, raw material expenses, and developing innovative batch and continuous processes. In addition, it discusses concepts to simplify chemical processing and shows how manufacturing processes can be improved while still remaining "green." Case studies illustrate the concepts presented.

The book also addresses economics, safety, and ecology, and provides tools directed toward breaking the barriers of outdated manufacturing traditions.