



# Chemical Micro Process Engineering: Fundamentals, Modelling and Reactions

By Volker Hessel, Steffen Hardt, Holger Löwe

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Micro process engineering is approaching both academia and industry. With the provision of micro devices and systems by commercial suppliers, one main barrier for using these units has been eliminated. More and more they become familiar, thereby being one facet of the upheaval in chemical industry. This book focuses on processes rather than on devices: what is 'before' and 'behind' micro device fabrication. A comprehensive and detailed overview is given on: a multi-faceted, hierachic analysis of chemical micro process technology; modelling and simulation of micro reactors; liquid- and liquid/liquid-phase reactions; gas/liquid reactions; and Gas-phase reactions (heterogeneous catalysis).

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### Editorial Review

#### Review

"In conclusion this is an excellent, comprehensive summary of the state-of-the-art in micro reactors and should be read by all process chemists and engineers interested in the field.... every industrial library involved in process R&D and chemical manufacture should purchase a copy." (*Organic Process Research & Development*)

"The critical evaluation of currently known microprocessors, the comprehensive analysis of the literature plus the numerous references make Chemical Micro Process Engineering a real handbook of chemical microtechnology, which will serve as a valuable information source for scientists of all disciplines. ... This book is a must for anyone interested in the application of microdevices to chemistry, and is of interest for chemists seeking new reactions, new conditions, and new catalysts, as well as for chemical engineers interested in process intensification.... However, because of its highly informative contents with many references, analyses of literature data, and critical evaluations of existing microsystems, this book is a true handbook of microdevices applied to chemistry, from which readers can derive valuable information for their own work." (*Angewandte Chemie I.E.*, Vol. 43, No. 48, 2004)

"It is clear that this book will help the chemical engineer to identify a relevant microreactor to implement a given chemical reaction. In this period where time is more than ever money, this book will be useful to quickly investigate the capabilities of these new devices to replace conventional ones in respect to both economical and ecological reasons." (*CIT - Chemie Ingenieur Technik*)

#### Review

#### From reviews to the project proposal:

"Dr. Hessel is regarded as one of the top three international experts in this field."

—Ronald S. Besser, Louisiana Tech University, USA

"... There is no book with such a strong engineering focus on the market. All authors are internationally known for their work ..."

—S.J. Haswell, University of Hull, UK

"The authors are leading in this field and have an outstanding international reputation."

—Dr. Handa, BP Chemicals, UK

"The reputation of the authors is very high, they are leading experts in the area of microtechnology."

—Dr. Bayer, Siemens Axiva, Frankfurt/M., Germany

"The authors are recognized and competent experts on the topic of microtechnology."

—Prof. Hönicke, TU Chemnitz, Germany

"Besides being practical and informative, it's also a book a chemical engineer might have on his or her coffee table."

—Dr. Gerald S. Ondrey

## From the Back Cover

Micro process engineering is approaching both academic and industry. With the provision of micro devices and systems by commercial suppliers, one main barrier for using these units has been eliminated. More and more they become familiar, thereby being one facet of the upheaval in chemical industry.

This book focuses on processes rather than one devices: what is 'before' and 'behind' micro device fabrication. A comprehensive and detailed overview is given on:

- Deductive analysis and rational design for chemical micro processing
- Modelling and simulation for chemical micro processing
- Microflow liquid-phase reactions (organic synthesis)
- Microflow gas/liquid reactions
- Microflow gas phase reactions (heterogeneous catalysis)

## Users Review

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