

Micro Process Engineering: A Comprehensive Handbook

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This three-volume handbook provides an overview of the key aspects of micro process engineering.
Volume 1 covers the fundamentals, operations and catalysts, volume 2 examines devices, reactions and applications, with volume 3 rounding off the trilogy with system, process and plant engineering.

Fluid dynamics, mixing, heat/mass transfer, purification and separation microstructured devices and microstructured reactors are explained in the first volume.

Volume 2 segments microreactor design, fabrication and assembly, bulk and fine chemistry, polymerisation, fuel processing and functional materials into understandable parts.

The final volume of the handbook addresses microreactor systems design and scale-up, sensing, analysis and control, chemical process engineering, economic and eco-efficiency analyses as well as microreactor plant case studies in one book.

Together, this 3-volume handbook explains the science behind micro process engineering to the scale-up and their real life industrial applications.

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Editorial Review

From the Back Cover
With chemical engineering and chemistry moving towards miniaturised and more complex systems, this 3 volume comprehensive handbook is a necessity for all involved in the process.
Each of the three volumes is separated into parts which focus on vital areas in micro process engineering. Areas from bulk and fine chemistry to sensing, analysis and control are covered with explanations on design and the fluiddynamics governing this interesting topic. Physics, chemistry and engineering are combined to provide a complete picture of the process.
Chemical schemes and photographs allude to the intricate details and finesse required in creating micro reactors.
A truly magnificent reference guide for both industrial as well as academic chemists, as well as chemical and process engineers.

About the Author
Volker Hessel, born 1964, was appointed Vice Director of R&D and Head of the Chemical Process Technology Department at the Institute for Microtechnology Mainz GmbH (IMM) in 2002. His department focuses on mixing, fine chemistry, and energy generation by fuel processing using microstructured reactors. He obtained his Ph.D. from the University of Mainz on organic chemistry in 1993, investigating structure-property relations of supramolecular structures. After having been appointed Group Leader for Microreaction Technology at the IMM in 1996, he became head of the newly founded Department of Microreaction Technology in 1999. He is author of more than 90 peer-reviewed publications in the field of organic chemistry and chemical micro process engineering, 200 papers in total, three books and 15 patents.

Jaap Schouten is full professor in Chemical Reactor Engineering. He obtained his Master's degree (Ir. - cum laude) in Chemical Engineering from the University of Twente, the Netherlands, in 1983. He received his Ph.D. in 1988 from Delft University of Technology. His Ph.D. research concerned emissions reduction during fluidized bed combustion of coal.
In 1988 he joined the Detergents Group of the Unilever Research Laboratory in Vlaardingen, worked at Delft University of Technology 1990 to 1998, and was appointed full professor at Eindhoven University of Technology in 1998, where he lectures on chemical reactor design and operation. His present research activities focus on catalytic microstructured reactors, structured multiphase reactors, and transient reactor operation. He has published more than 180 papers in journals and conference proceedings.

Prof. Dr. Albert Renken studied chemistry at the Technical University of Hanover, Germany, obtained his Ph.D. in 1968 and his habilitation 1973 in technical chemistry with a work on transient process control for the optimization of chemical reactors. From 1973 to 1977 he lectured at the Technical University of Hanover and was group leader at Hoechst AG in Frankfurt, Germany. Since 1977 he is a professor for chemical reaction engineering at ETH Lausanne, Switzerland, his research areas being polymerization technology, heterogeneous catalysis, transient process control of chemical reactors, and microreaction engineering. He is author of over 350 scientific publications in journals and books and of numerous patents. From 1992 to 2000, Albert Renken was science councillor (Forschungsrat) of the Swiss National Science Foundation (SNF), and from 1996 to 2000 he served as chairman of the European Federation of Chemical Reaction Engineering Working Party.

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