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Nota di contenuto	Fluid Dynamics in Microchannels. Multiphase Flow / Axel Gunther, Michiel T Kreutzer -- Microfluidic Networks / Norbert Kockmann -- Boiling and Two-Phase Flow in Microchannels / John R Thome, Gherhardt Ribatski -- Microscale Flow Visualization / Marko Hoffmann, Michael Schluter, Norbert Rabiger -- Modeling of Microfluidic Devices / David F Fletcher, Brian S Haynes, Joelle Aubin, Catherine Xuereb -- Mixing in Microsystems. Characterization of Mixing and Segregation in Homogeneous Flow Systems / Laurent Falk, Jean-Marc Commenge -- Passive and Active Micromixers / Zhigang Wu, Nam-Trung Nguyen -- Mixing and Contacting of Heterogeneous Systems / Asterios Gavriilidis, Panagiota Angeli -- Heat/Mass Transfer. Heat Transfer in Homogeneous Systems / Franz Trachsel, Philipp Rudolf von Rohr -- Transport Phenomena in Microscale Reacting Flows / Niket S Kaisare, Georgios D Stefanidis, Dionisios G Vlachos -- Fluid-Fluid and Fluid-Solid Mass Transfer / Michiel T Kreutzer, Axel Gunther -- Microstructured Devices for Purification and Separation Processes. Extraction / Nobuaki Aoki, Kazuhiro Mae -- Capillary Electrochromatography / Hans-Joerg Bart -- Microstructured Reactors. Homogeneous Reactions / Volker Hessel, Patrick Lob -- Heterogeneous Multiphase Reactions / Madhvanand N Kashid, David W Agar, Albert Renken, Liubov Kiwi-Minsker -- Photoreactors / Roger Gorges, Andreas Kirsch -- Microstructured Reactors for Electrochemical Synthesis / Sabine Rode, Francois Lopicque -- Microreactor Design, Fabrication and Assembly. Silicon and Glass Microreactors / Roald M

Tiggelaar, J G E (han) Gardeniers -- Metallic, Steel, Ceramic and Plastic Microreactors / Jurgen J Brandner -- Bulk and Fine Chemistry. Liquid- and Liquid-Liquid-Phase Reactions : Aliphatic Substitution Reactions / Paul Watts, Charlotte Wiles -- Liquid- and Liquid-Liquid-Phase Reactions : Aromatic Substitution Reactions / Stefan Lobbecke -- Liquid- and Liquid-Liquid-Phase Reactions : Addition and Elimination / Jun-Ichi Yoshida, Aiichiro Nagaki -- Liquid- and Liquid-Liquid-Phase Reactions : Coupling Reactions / Ilhyong Ryu, Takahide Fukuyama -- Liquid- and Liquid-Liquid-Phase Reactions : Oxidations and Reduction / Jun-Ichi Yoshida, Aiichiro Nagaki -- Gas-Liquid-Phase Reactions: Substitution / Jun-Ichi Yoshida, Aiichiro Nagaki -- Gas-Liquid-Phase Reactions: Addition / Claude de Bellefon -- Gas-Liquid-Phase Reactions: Reduction / Harshal Surangalikar, Shaun McGovern, Ronald S Besser -- Gas-Liquid-Phase Reactions: Miscellaneous Reactions / Ilhyong Ryu, Md Taifur Rahman -- Polymerization. Free Radical Polymerization / Christophe Serra -- Living Radical Polymerization / Thomas E Enright -- Cationic Polymerization / Jun-Ichi Yoshida, Aiichiro Nagaki -- Polycondensation / Takeshi Honda, Hideaki Maeda -- Functional Materials. Organic Particles and Pigments / Hieng Kim -- Inorganic Particles / Michael Kohler -- Polymer Particles / Christophe Serra -- Microencapsulates, Proteins and Lipids/Vesicles / John van der Schaaf -- Oil-in-Water and Water-in-Oil Emulsions / Heike P Schuchmann, Karsten Kohler, Freddy Aguilar, Andreas Hensel -- Double, Triple and Complex Multilayered Emulsions / Takasi Nisisako -- Microreactor Applications in the Consumer Goods Industry / Patrick Lob, Volker Hessel, Alberto Simoncelli -- Fuel Processing. Application and Operation of Microreactors for Fuel Conversion / Peter Pfeifer, Katja Haas-Santo, Oliver Gorke -- Steam Reforming / Gunther Kolb -- Partial Oxidation / Peter Pfeifer -- CO Clean-Up: Water Gas Shift and Methanation Reactions / Andre C van Veen, Yves Schuurman, Claude Mirodatos -- CO Clean-Up: Preferential Oxidation / Xun Ouyang, Ronald S Besser -- Microreactor Systems Design and Scale-Up. Structured Multi-Scale Process Systems Design and Engineering : The Role of Microreactor Technology in Chemical Process Design / Michael Matlosz, Laurent Falk, Jean-Marc Commenge -- Reaction and Process System Analysis, Miniaturization and Intensification Strategies / Jean-Marc Commenge, Laurent Falk -- Principles and Guidelines for Selection of Microstructured Devices for Mixing and Reaction / Gunter Tekautz, Barbara Zechner, Lukas E Wiesegger, Dirk Kirschneck -- Catalyst Development, Screening and Optimization / Andre C van Veen, Yirk Schuurman, Claude Mirodatos -- Sensing, Analysis, and Control. Microtechnology and Process Analytics / Melvin V Koch, Ray W Chrisman -- Optical In-Line Spectroscopy in Microchemical Processes / Wolfgang Ferstl -- On-Line Monitoring of Reaction Kinetics in Microreactors Using Mass Spectrometry and Micro-NMR Spectroscopy / Jacob Bart, Han Gardeniers -- Automation and Control of Microprocess Systems / Thomas Bayer, Olaf Stange -- Microreactor Plants: Case Studies. Industrial Microreactor Process Development up to Production / Volker Hessel, Patrick Lob, Holger Lowe -- Microreactor Plant for the Large-Scale Production of a Fine Chemical Intermediate: A Technical Case Study / P Poechlauer, M Vorbach, M Kotthaus, S Braune, R Reintjens, F Mascarello, G Kwant -- Development and Scale-Up of a Microreactor Pilot Plant Using the Concept of Numbering-Up / Shigenori Togashi -- Microstructures as a Tool for Production in the Tons per Hour Scale / Dirk Kirschneck, Gunter Tekautz -- Economics and Eco-Efficiency Analyses. The Economic Potential of Microreaction Technology / Dana Kralisch, Ulrich Krtschil, Dominique M Roberge, Volker Hessel, Dirk Schmalz -- Life Cycle Assessment of Microreaction

Technology Versus Batch Technology : A Case Study / Dana Kralisch --
Exergy Analysis of a Micro Fuel Processing System for Hydrogen and
Electricity Production : A Case Study / Krzysztof J Ptasinski.

Sommario/riassunto

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.
