

Editorial

Special Issue: Microreaction Technology

The importance of Microreaction Technology in Chemical Reaction Engineering has experienced spectacular developments in the recent past. Six International Conferences on Microreaction Technology (IMRET) have been organized alternatively in Europe by DECHEMA and North America by AIChE. The seventh International Conference on Microreaction Technology (IMRET 7) was held in Lausanne, Switzerland in September 2003. Microstructured reactors are mainly characterized by their very high surface to volume ratio compared to traditional chemical reactors. Multichannel microreactors having channel diameters in the order of ten to several hundred micrometers have specific surface areas up to $50000 \text{ m}^2/\text{m}^3$. This value is roughly two orders of magnitude higher compared to conventional production vessels.

Due to the small reactor dimensions diffusion times are short and the influence of mass transfer on the rate of reaction can be efficiently reduced. As the heat transfer performance is greatly improved compared to conventional systems, higher reaction temperatures are admissible leading to reduced reaction volumes and amount of catalyst. Therefore, microstructured reactors are especially predestinated for fast, highly exothermic or endothermic chemical reactions. Although the flow in the channels is laminar, a uniform radial concentration profile and consequently a narrow residence time distribution is obtained. This allows to optimize the contact time in the reactors and to avoid unwanted consecutive reactions.

In consequence, microstructured reactors allow accurate tuning and control of chemical reaction kinetics leading to impressively high selectivities and efficient use of energy. In addition, they are a versatile tool for the development of sus-

tainable chemical processes. Further objectives of the miniaturized reactor systems concern the generation of chemical information, the facilitation or even suppression of scale up procedures, and process intensification.

For communication of the latest scientific and industrial advances in all areas of microreaction technology, IMRET 7 provided an ideal forum with about 330 participants from 20 countries around the world. The more than 120 oral and poster contributions covered recent developments in the areas of chemical research, process intensification and new energy systems. Special sessions were organized in the domain of manufacturing and characterization of microstructured devices.

The manuscripts in this volume were reviewed by experts and followed by the author's revisions to incorporate their suggestions. We hope that the material presented will be of value for the scientific and technical community and will stimulate further research, design and application.

Finally, we thank the members of the Scientific Committee and also the reviewers who carried out the refereeing process. We also express our gratitude to the authors for their contributions.

Albert Renken
Jörg Peter Baselt
Michael Matlosz

*A. Renken, Conference Chair:
Laboratory of Chemical Reaction Engineering
Swiss Federal Institute of Technology
CH-1015 Lausanne, Switzerland*

Tel.: +41-21-693 3181; fax: ++41-21-693 3190
E-mail address: albert.renken@epfl.ch (A. Renken)