

Preface

This special issue documents the proceedings of two sessions entitled “Micro Technology in Catalyzed Reaction Systems”, held during the Topical “Applications of Microreactor Engineering” at the 2006 AIChE Spring Conference. Contributions from the meeting were selected and supplemented by a number of invited papers. The papers are grouped thematically in four sections, covering the following facets of the new technology: the majority of these papers deal with discovering applications in organic chemistry and fuel processing. In addition, scientific contributions about kinetics, in situ analysis and catalyst preparation/coating are given. Thus, a broad range of topics is covered, from X-ray absorption spectroscopy under operating conditions, the preparation of zeolite films (ZSM-5), gas–liquid–solid asymmetric hydrogenation, direct hydrogen peroxide synthesis, fuel processing with focus on methanation, water-gas shift, methanol oxidative reforming, in situ propellant production all the way to the dehydration of bioethanol.

The motivation to dedicate a special issue of Catalysis Today to the topic stems from the Topical 1 “Applications of Microreactor Engineering” held at the AIChE Spring Meeting April 23–25, 2006 in Orlando/US under the umbrella of the Process Development Group (PDD) at AIChE. With 53 oral presentations, almost 80 papers, and eight sessions, Topical 1 was the largest single event within the 1500-attendees’ conference, confirming that there is interest in this new tool kit in the applied engineering community. Besides the conventional micro-topics of fine chemistry, catalysis, mixing and heat exchange, the topical sessions embraced the emerging fields of dispersions, particles, and process analytical technology. Besides the well-attended topical sessions, a market panel discussion, attended by some 100 participants, allowed for sharing of ideas, scepticism and optimism.

The papers show that microreaction technology is well on its way to becoming a routine tool in catalysis. Especially, the state of the art in catalyst preparation and coating, much improved in the last years, now offers a choice in catalysts similar to that of

conventional systems. The scope of applications has broadened and also delicate gas–liquid–solid processing is reported more often in microreactors these days. Although not covered by this issue explicitly, but being a topic of the respective presentations, a further trend to mention is the scale-out of catalytic wall-coated reactors to large units of almost meter size. These large-scale microstructured reactors now approach true production targets, especially in the field of fuel processing. This shows how far the industrial implementation of the new technology has proceeded in specific cases.

In 2008, the first joint ACS and AIChE Conference will be held—chemistry meets chemical engineering and vice versa. This is going to be the largest event in both fields ever; some 10,000 attendees are expected. This will give further stimulus to microstructured catalyzed reaction systems, since the main microreactor conference, IMRET, will be held under this umbrella and will be featured for the first time for the large ACS chemist community.

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