Preface

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The *Journal Biomass Conversion and Biorefinery—Processing of Biogenic Material for Energy and Chemistry* is well developing. The scope of the journal is extremely wide covering research, development, and applications in thermo-chemical conversion, physiochemical conversion and bio-chemical conversion including all necessary steps for the provision and preparation of the biomass as well as all downstream process steps for product generation. Therefore, the content in the papers in the general issues are also wide spread and not focused on specific topics. However, most of the readers are working only in one of these fields and might be interested in more papers on the same topic in one issue. Therefore, the editors-in-chief decided to produce also issues for selected specific topics. In this issue of the journal, the contributions are dedicated to the topic of thermal biomass gasification, gas cleaning and upgrading, and applications of syngas for polygeneration processes.

Biomass gasification has turned out as a key technology for biomass utilization in the future. All forms of energy currently used can be produced via thermal conversion of solid biomass into syngas: heat, electricity, and synthetic biofuels. Even more, chemicals can be generated from syngas originating from biomass. Syngas production, syngas cleaning, and syngas utilization are subjects of research programs in several countries and enormous progress has been achieved in this field in the recent years. Furthermore, polygeneration is the key word for future efficient and sustainable biomass utilization. Polygeneration based on thermo-chemical biomass conversion can also be addressed as one type of a biorefinery, a so-called syngas platform based biorefinery.

The International Conference on Polygeneration Strategies held in Vienna in 2011 (ICPS11) was focussed on these

topics. Numerous oral and visual presentations were given at this conference on biomass gasification, syngas cleaning and upgrading, syngas utilization, and modeling and simulation of the whole process chain. Some of the best papers were selected by the chairman and the authors were invited to submit an extended version of the paper to this journal. Extended version means that the paper presented in the proceedings of ICPS11 had to be extended by including:

- the outcome of the discussion after the presentation at the ICPS11
- additional results since the submission of the paper to the ICPS11 conference
- if available, additional information which has to be left out due to time or other restrictions at the conference.

All delivered invited papers fulfilled the task and were extended in the above mentioned manner. This extended papers had to be submitted according to the requirements and guidelines of this journal and the normal reviewing process was carried out. Eight papers, which is the typical number of papers for an issue, were successfully reviewed and are now presented in this special issue on “Progress in Syngas Production and Utilization”.

Four contributions are dealing with biomass gasification and all of them show specific features on syngas production for polygeneration. All gasification processes presented use a dual fluidized bed configuration to obtain a nitrogen free syngas with a high hydrogen content. The papers include on the one hand side investigations on fluid dynamics for a novel design as well as testing in hot test rigs and pilot plants and on the other hand side the current state of the development for adsorption enhanced reforming as well as of a pilot plant type with a heat pipe reformer.

Two further presentations are included with experimental investigations for syngas treatment and a syngas application for Fischer–Tropsch synthesis. Producer gas cleaning with ilmenite and a manganese oxide as catalysts in a dual fluidized bed reformer was studied and the results presented in one of these two papers. In case of Fischer–Tropsch

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synthesis the influence of pressure on the performance of biomass based Fischer–Tropsch synthesis has been investigated in a test rig using real syngas online from the Güssing biomass gasification plant.

Finally, two contributions are dedicated to modeling and simulation. Fundamental studies on carbon conversion in a TGA are used to create a simple but suitable model of char conversion of single fuel particles. The whole process chain for synthetic natural gas production is assessed by a

simulation tool and the potential for small scale application is presented in the final contribution.

This is the first issue of the *Journal Biomass Conversion and Biorefinery* that is dedicated to a specific topic. Further issues containing contributions focused to other specific topics within the scope of the journal will follow in the near future.

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(Co-Editor-in-Chief and Chairman of ICPS11)