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EDITORIAL

Editorial

Putla Sudarsanam [1]

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The efficient utilization of renewable energy is essential for a sustainable economy. Renewable sources of energy are abundantly available in nature and can provide sufficient energy to meet the needs of increasing population growth and even strong economic developments. Controlling atmospheric levels of CO_2 as well as global warming caused by the combustion of non-renewable fossil fuels are also the primary reasons to utilize renewable energy as an alternative to fossil fuel energy. Biomass is one of the key renewable energy sources and it contains highly functionalized molecules composed of carbon, oxygen, and hydrogen [1–3]. These functional molecules can be selectively converted into industrially relevant fuels, chemicals, and advanced materials.

Catalysis is vital for chemical production in industry. The synthesis of about 80% of the chemicals produced globally by industry involves at least one catalytic step; this clearly indicates the significance of catalytic-controlled processes for countries' economic growth. Especially, heterogeneous solid catalysts are attractive candidates because of their remarkable hydrothermal/chemical stability and efficient recovery/reusability compared to homogeneous liquid catalysts [1, 4, 5]. Over the last three decades, significant advances have been made in the fields of chemistry, materials science, and nanotechnology providing potential methodologies and strategies for the development of cost-effective, novel heterogeneous catalytic materials. Functionalized solid catalysts with optimum amounts of acid-base and redox-active sites are needed to catalyze biomass conversions in a one-pot way—a promising route towards viable biorefinery approaches.

This thematic issue titled "Catalytic Biomass Valorization – Status and Perspectives" highlights recent advances in biomass valorization using functionalized heterogeneous catalytic materials. The various articles in this Thematic Issue provide deep insights into various ongoing research activities and methods. Among others, this includes catalysts' synthesis (banana trunk ash, silica-supported perchloric acid, supported platinum-tungstate, ionic liquids, etc.), investigation of their physicochemical, morphological, acid-base, and redox properties using numerous analytical techniques as well as their catalytic performance for the conversion of various biomass molecules, such as soybean oil, furfural and relevant aldehydes, glycerol, 5-(halomethyl)furfural, furfuryl alcohol, and angelica lactone. In addition, the role of plasma in syngas tar cracking as well as selective catalytic conversion of lignin into drop-in chemicals and polymer precursors is covered in this Thematic Issue.

We hope that readers will find this compilation of articles highlighting contributions in catalytic biomass valorization both informative and inspiring for their future research endeavors in biorefinery research. Finally, I would like to thank the authors for submitting their valuable work to this Thematic Issue as well as all the reviewers for their constructive comments and suggestions that greatly helped to improve the quality of the articles.

Dr. Putla Sudarsanam

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✉ Putla Sudarsanam
s.putla@ncl.res.in

[1] Catalysis and Inorganic Chemistry Division, CSIR-National Chemical Laboratory, Dr Homi Bhabha Road, Pashan, Pune 411 008, India