

HOMOGENEOUS CATALYSIS IN BIOMASS-BASED SOLVENTS

Speaker

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Abstract

Solvents are intrinsic parts of many chemical reactions, and the “solvent-friendly chemical thinking” has evolved due to its many practical advantages. Industrial activities have resulted in the release of volatile organic compounds (VOCs), including conventional solvents, into the environment, and several of them have led to serious environmental concerns. According to FDA guidelines, the utilization of some “classic” organic solvents, such as benzene or toluene, must be avoided or limited. However, if solvents are necessary to perform appropriate transformations, alternatives with minimal or no environmental impact have to be selected and introduced into the process and synthetic chemistry.

The research activities focusing on the replacement of conventional and usually toxic organic solvents have led to the identification of biomass-based alternative reaction media such as alkyl levulinates, γ -valerolactone, 1,4-pentanediol, Cyrene™ and its derivatives that can be utilized for industrially important homogeneous catalytic reactions.

Recently, several catalytic reactions such as acid-catalyzed dehydration of various carbohydrates, carbonylation reactions, as well as cross-coupling reactions, hydrogenation etc. were demonstrated in biomass-based solvents. Details of the applications of biomass-based solvents by the concept of “from Molecular Level to Process Design (MoLePoD)”, including their advantages and limitations, will be presented and discussed.

Biography

László T. Mika is a full professor with tenure at the Budapest University of Technology and Economics and Head of the Laboratory of Catalysis and the Department of Chemical and Environmental Process Engineering. He is the vice-head of the Georg Olah Doctoral School of the Faculty of Chemical Technology and Biotechnology. He received his PhD in organic- and organometallic chemistry at Eötvös University Budapest, Hungary, under the direction of Prof. István T. Horváth in 2010. His research activity, documented by about 70 scientific papers and 15 book chapters, covers different areas of green chemistry, including the application of novel reaction media, homogeneous catalysis, biomass conversion, and the design of catalytic systems. He received several prizes and awards, such as Bolyai Prize and Géza Zemplén Grand Prize of the Hungarian Academy of Sciences, Best Teacher and Best Scientific Paper Awards of the Budapest University of Technology and Economics.



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