Catalytic Fractionation and Valorization of Lignocellulosic Biomass

Yuhe Liao

Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences, CHINA
liaoyh@ms.giec.ac.cn; yuhe.liao20@gmail.com

Lignocellulosic biomass contains cellulose, hemicellulose, and lignin, and cellulose is encapsulated in an amorphous, cross-linked hemicellulose/pectin matrix in primary cell walls and a hemicellulose/lignin matrix in secondary cell walls. This structural arrangement gives plants their strength and rigidity, and it makes cellulose highly resistant to biological and chemical attack. Selective fractionation of lignocellulosic biomass towards different components is the key to achieve the valorization of the whole biomass. However, the traditional fractionation methods focused on utilization of cellulose and hemicellulose. Lignin is usually treated as a waste due to partial depolymerization and repolymerization toward recalcitrant structure, which hampers depolymerization of lignin. In the presentation, it will show the works we have done for catalytic fractionation of lignocellulosic biomass to obtain solid holocellulose and lignin oil. Meanwhile, catalytic valorization of the obtained lignin oil towards high value chemicals and fuels will be discussed.

References

[1] Y. Liao, S.-F. Koelewijn, G. Van den Bossche, J. Van Aelst, S. Van den Bosch, T. Renders, K. Navare, T. Nicolaï, K. Van Aelst, M. Maesen, H. Matsushima, J. Thevelein, K. Van Acker, B. Lagrain, D. Verboekend, B.F. Sels, *Science* **367** 1385(2020)

[2] Y. Zhu, Y. Liao, L. Lu, W. Lv, J. Liu, X. Song, Ji. Wu, L.Li, C. Wang, L. Ma, B.F. Sels, *ACS Catal.* **13** 7929 (2023)

[3] J. Bai, H. Li, Y. Zhu, Y. Zhu, C. Wang, H. Wang, Y. Liao, *ChemSusChem* **16** e202300558 (2023)

[4] X. Wu, Y. Liao, J. Bomon, G. Tian, S.-T. Bai, K. Van Aelst, Q. Zhang, W. Vermandel, B. Wambacq, B.U.W. Maes, J. Yu, B.F. Sels, *ChemSusChem.* **15** e202102248 (2022)

Catalytic Fractionation and Valorization of Lignocellulosic Biomass

Yuhe LIAO

Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences
liaoyh@ms.giec.ac.cn; yuhe.liao20@gmail.com

BIO

Yuhe Liao currently is a professor at Guangzhou Institute of Energy Conversion (GIEC), Chinese Academy of Sciences. He received his PhD in Bioscience Engineering at KU Leuven in 2018 under the guidance of Prof. Bert F. Sels and Dr Danny Verboekend in the field of heterogeneous catalysis for biomass conversion. Afterwards, he did post-doctoral work (2018–2020) at the same university on the topic of CO_2 capture and utilization. The research of his group focuses on heterogeneous catalysis, biomass and CO_2 conversion, and organic waste valorisation.