

BIOFUEL AND BIOCHEMICAL SYNTHESIS IN SUPERCRITICAL FLUIDS

Jaehoon Kim^{1,2,3*}

¹ School of Chemical Engineering, Sungkyunkwan University, 2066 Seobu-Ro, Jangan-Gu, Gyeonggi-Do 16419, Republic of Korea

¹ School of Mechanical Engineering, Sungkyunkwan University, 2066 Seobu-Ro, Jangan-Gu, Gyeonggi-Do 16419, Republic of Korea

² SKKU Advanced Institute of Nano Technology (SAINT), Sungkyunkwan University, 2066 Seobu-Ro, Jangan-Gu, Gyeonggi-Do 16419, Republic of Korea.

Abstract

Supercritical fluids can offer environmentally benign and effective reaction conditions for the production of biofuels and biochemicals owing to their unique physical properties, including low viscosity, fast diffusion, zero surface tension, tunable physical properties, and high reactivity. This talk will be organized into two parts. The first part will cover biocrude production using supercritical alcohols. The biomass conversion, yield, and properties of biocrude depending on varying process parameters are discussed [1-4, 7-9]. The second part will discuss synthesis of biochemicals using multifunctional catalysts. High-yield methyl lactate and 2,5-dimethylfuran were synthesized using multi-functional catalysts in supercritical or subcritical fluids [5,6].

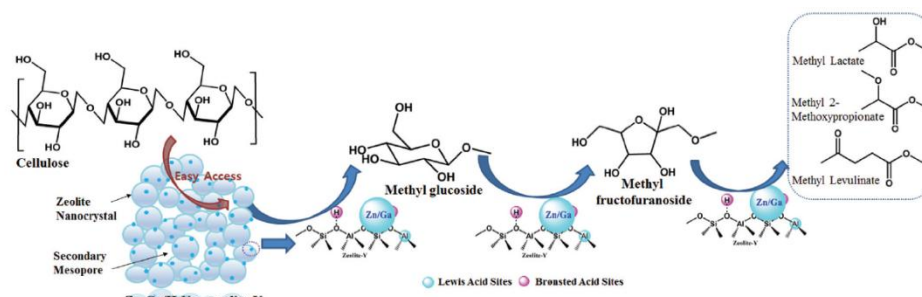


Figure 1. cellulose conversion to the major liquid products over Ga-doped Zn/HNZY in supercritical methanol [6]

Reference(s)

- [1] A. Riaz, C. S. Kim, Y. Kim*, J. Kim*, *Fuel* **172**, 238–247 (2016).
- [2] H. Prajitno, R. Insyani, J. Park, C. Ryu, J. Kim*, *Appl. Energy*, **172**, 12–22 (2016)
- [3] H. Zeb, D. J. Choi, Y. Kim*, J. Kim*, *Energy*, **118**, 116–126 (2017)
- [4] M. J. Hidajat, A. Riaz, J. Park, R. Insyani, J. Kim*, *Chem. Eng. J.*, **317**, 9–19 (2017)
- [5] R. Insyani, D. Verma, S. M. Kim, J. Kim*, *Green Chem.*, **19**, 2842–2490 (2017)
- [6] D. Verma, R. Insyani, Y.-W. Suh, S. K. Kim, J. Kim, *Green Chem.*, **19**, 1969–1982 (2017)
- [7] H. Prajitno, J. Park, C. Ryu, J. Kim*, *Fuel*, **200**, 146–152 (2017)
- [8] H. Jo, H. Prajitno, H. Zeb, J. Kim*, *Energy Conv. Manag.*, **148**, 197–209 (2017)
- [9] H. Zeb, J. Park, A. Riaz, C. Ryu, J. Kim*, *Chem. Eng. J.*, **327**, 79–90 (2017)