# Catalytic decomposition of microcrystalline cellulose and empty fruit bunch (EFB) in low polar organic solvents at sub- and supercritical conditions

Koriakin Anton, Hai Van Nguyen, 김두욱, 이창하†
연세대학교
(leech@yonsei.ac.kr†)

In this study, direct thermochemical liquefaction of microcrystalline cellulose and empty fruit bunch (EFB) was carried out using sub- and supercritical solvents in a high pressure batch reactor. Decomposition of biomass was studied in various organic sub- and supercritical solvents, which are widely used in industry. The effects of reaction temperature, hydrogen, and heterogeneous catalysts on decomposition efficiency were evaluated for each solvent. Hydrogen pressure has little effect on conversion of biomass in the absence of catalyst. It was demonstrated that $-SO_3H$ acidic catalyst improves hydrogen transfer only in protic polar. On other hand, metal oxide catalyst significantly suppressed the char formation while liquefaction efficiency was significantly improved to almost complete level in low polar solvents in reducing conditions at reaction temperatures above 350ºC. The variety of obtained products was also smaller in low polar solvents. To confirm the liquefaction efficiency of reaction conditions, real biomass EFB was subjected for liquefaction reactions. The thermal-treated chars showed a fair to good adsorption capacity of $CO_2$ compared to activated carbon.