

Catalytic upgrading of bio-crude using a packed bed reactor under supercritical conditions

전원진, Maria Minichova, 이인구[†]
한국에너지기술연구원
(samwe04@kier.re.kr[†])

Bio-crude, obtained from fast pyrolysis of biomass feedstocks, is a promising renewable resource for production of fuels and valuable chemicals. In the aspect of fuel production, the bio-crude has the high oxygen content and thus it should be deoxygenated via chemical processes, such as bio-refinery. For example, the hydrogenation reaction of the bio-crude with a high pressure of hydrogen gas is a successful method for enhancing fuel properties of the bio-crude. However, the high consumption of pure hydrogen gas may reduce economical feasibility of the process. In our research, the catalytic upgrading of the bio-crude was performed under supercritical conditions using a packed bed reactor. Instead of the external hydrogen source, ethanol was used as both a reaction solvent and a hydrogen source. The fuel properties of the bio-crude, such as higher heating value (HHV) and acidity, were remarkably enhanced after the upgrading process. In addition, we investigated the effects of operation parameters, such as temperature, pressure and liquid hourly space velocity (LHSV), on the fuel properties of products.