

Spray pyrolysis synthesis of nickel loaded mesoporous SiO₂/γ-Al₂O₃ composites and their application for hydrodeoxygenation of a bio-oil model compound

한상진, Quoc Khanh TRAN¹, Hoang Vu LY¹, 김승수¹, 김진수[†]

경희대학교; ¹강원대학교

(jkim21@khu.ac.kr[†])

Alumina (γ-Al₂O₃) and silica(SiO₂) have been widely used as catalysts/catalyst supports for hydrodeoxygenation in bio-oil, because of their high surface area, thermal and chemical stability. The HDO is one of the promising methods for upgrading bio-oil by removal of oxygen-containing compounds. In this study, SiO₂/γ-Al₂O₃ composites were synthesized by spray pyrolysis combined with sol-gel process. And also, nickel metal was doped on composites for improving HDO. The spray pyrolysis method has advantages of synthesizing spherical nano- or micron-sized particles in one step and controlling the morphology of particles. Also, mass production is possible with this method as it is a continuous process. In order to control specific surface area and pore structures, the particles were prepared by adding CTAB as a template and to improve efficiency of HDO, metal source was added. The particles were analyzed by BET, XRD, FE-SEM and TPD and the produced gas and liquid was analyzed by GC with TCD/FID.