

[Catalytic hydrodeoxygenation of Geodae-Uksae pyrolysis oil over Ni/desilicated HZSM-5](#)

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J. Clean. Prod. 174 (2018) 763-770

Abstract:

This study investigates the effects of Ni impregnation and desilication on HZSM-5 for the hydrodeoxygenation (HDO) of biomass pyrolysis oil. Ni was impregnated in different supporting catalysts, HZSM-5 and desilicated HZSM-5 (DeHZSM-5), and used as catalysts for the catalytic HDO of Geodae-Uksae pyrolyzates. Between HZSM-5(30) and HZSM-5(80), which have different SiO₂/Al₂O₃ ratios (30 and 80), HZSM-5(80) showed the higher desilication efficiency. Ni/DeHZSM-5(80) revealed higher performance on the production of hydrocarbons during the catalytic HDO of Geodae-Uksae pyrolyzates than Ni/HZSM-5(30) because of the increased hydrophobicity, hydrogen reduction efficiency, and mesoporosity of Ni/DeHZSM-5(80) enhanced by the desilication of HZSM-5. Ni/DeHZSM-5(80) also produced larger amounts of esters during the liquid-phase catalytic HDO of Geodae-Uksae pyrolysis oil using supercritical ethanol as a solvent in a high-pressure batch reactor. The two-step catalytic upgrading reaction via the catalytic pyrolysis of Geodae-Uksae over HZSM-5(30) followed by catalytic HDO reaction over Ni/DeHZSM-5(80) enhanced not only the formation of aromatic hydrocarbons and cycloalkanes but also decreased the coke yield on Ni/DeHZSM-5(80).

* Excerpted from online journal website (Click the title)

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RX-3050TR, HP-3050FC, MJT-1035E