Pyrolysis and catalytic upgrading of Citrus unshiu peel

B-S. Kim, Y-M. Kim, J. Jae, C. Watanabe, S. Kim, S. C. Jung, S. C. Kim, Y-K. Park
Bioresource Technol. 194 (2015) 312-319

Abstract:

Ex situ catalytic pyrolysis of Citrus unshiu (C. unshiu) peel was performed using a tandem μ-reactor–GC/MS consisting of two sequential furnaces. The pyrolyzates of C. unshiu peel, composed mainly of alcohols, ketones and furans produced in the 1st furnace of the reactor, were upgraded to aromatics by the use of catalysts in the 2nd furnace. Compared to wood powder, C. unshiu peel produced larger amounts of aromatics over HZSM-5(23). Among the various catalysts, HZSM-5(23) and HBETA(25) showed high aromatic yields, 6.78 C% and 9.69 C%, respectively. HBETA(25) produced large amounts of undesirable PAHs (3.59 C%). During the sequential catalytic upgrading test, the yield of BTEXs (benzene, toluene, ethylbenzene, xylenes) over HZSM-5(23) was reduced more slowly than that over HBETA(25) because of the slower deactivation of HZSM-5(23), which suggests that HZSM-5(23) is a more stable catalyst than the other catalysts used in this study during the sequential catalytic upgrading of C. unshiu peel pyrolyzates.

Frontier Labs products used:

Multi-Shot Pyrolyzer, UADTM-2.5N