# Catalytic co-pyrolysis of biomass carbohydrates with LLDPE over Al-SBA-15 and mesoporous ZSM-5

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Catal. Today 298 (2017) 46-52

Abstract:

The catalytic co-pyrolysis of biomass carbohydrates and LLDPE over mesoporous catalysts, mesoporous ZSM-5 (MZSM-5) and Al-SBA-15, was investigated using a tandem micro reactor-GC/MS system. The properties of the synthesized MZSM-5 and Al-SBA-15 were characterized by N2-sorption, X-ray diffraction, and $NH_3$-temperature programmed desorption. Compared to Al-SBA-15, MZSM-5 showed better performance in the production of aromatic hydrocarbons during the catalytic pyrolysis of carbohydrates (avicel (cellulose) and xylan) due to the stronger acidity of MZSM-5. The catalytic co-pyrolysis of carbohydrates and LLDPE showed synergistic aromatic formation due to the supply of more effective hydrocarbon pool species and an efficient Diels-Alder reaction between the pyrolyzates of the carbohydrates and LLDPE. When avicel was torrefied, the aromatic yields were increased further in catalytic pyrolysis/co-pyrolysis.



Frontier Labs Products used:

Tandem μ-Reactor (RX-3050TR)