Enhanced BTX Yield in Tetralin Hydrocracking over Hybrid Zeolite Matrices

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Petrochemicals derived from petroleum are an important raw chemicals for the production of plastics, resins, fibers, elastomers, lubricants, etc. Among them, BTX is the most common starting reactant to produce commodity chemicals. Chemically refractory heavy fractions such as LCO (light cycle oil), PFO (pyrolysis fuel oil) and C_{10}^{+} heavy aromatics are produced in large quantities as process by-products in oil refining and petrochemical plants. One option for upgrading these heavy fractions, in which naphthalene and alkylnaphthalenes contents are high, is to produce high value chemicals such as BTX. To obtain high yield of BTX, it is important to convert the 2- and 3-ring aromatics into 1-ring products in high selectivity followed by selective hydrocracking (HYC) of 1-ring aromatics into BTX. In this study, we employed hybrid zeolite comprised of 10 and 12-MR zeolites to further increase the per pass yield of BTX. Compared to our previous results from HYC over H-Beta zeolite, BTX yield can be much enhanced over hybrid zeolite matrices since the medium-pore zeolite (10MR) has high dealkylation activity for the conversion of alkylbebzenes (such as ethyl-benzene, propyl-benzene, ethyl-toluene etc.) other than BTX into BTX.