A hybrid zeolite matrix for the hydrocracking of tetralin into BTX

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A wide range of products such as solvents, fibers, films and plastics are produced from benzene, toluene and xylenes (BTX). BTX is mostly produced by naphtha reforming and pyrolysis in oil refining and petrochemical plants, respectively. In oil refining and petrochemical industries, chemically refractory heavy fractions such as LCO (light cycle oil) and PFO (pyrolysis fuel oil) are produced in large quantities as process by-products. These fractions, rich in naphthalene and alkylnaphthalenes, are required to be upgraded to high value products. An important approach for these fractions could be a catalytic solution to convert them into BTX. In our previous study, we showed that naphthalene can be selectively hydrogenated to tetralin. Then, tetralin can be subsequently hydrocracked into BTX over metal-supported H-Beta catalysts. In this study, we employed a hybrid zeolite matrix which is comprised of 10MR and 12MR to further enhance the per pass yield of BTX. The results showed that BTX yield can be much enhanced by employing a hybrid zeolite matrix since the medium-pore zeolite (10MR) gave rise to a high dealkylation activity for alkylbebzenes (ethyl-benzene, propyl-benzene, ethyl-toluene etc) into BTX.