

Control of acidic properties of MFI zeolites via heteroatom substitution and their effect on methane dehydroaromatization

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MFI zeolite is the one of the world-widely used catalysts in various industries because of the structural as well as acidic properties. In framework, Si^{4+} atoms can be substituted to heteroatoms such as Al^{3+} , Ga^{3+} and B^+ atoms, and it needs the charge compensator. When the charge compensator is H^+ , the acidic property can be generated. According to the choice of heteroatom, the acid strength as well as the size of particles are varied. In addition, the heteroatom sites in MFI zeolite is well-known as the anchoring sites of Mo impregnated as an active metal for methane dehydroaromatization (MDA). Thus, controlling of acidic properties with the substitution of heteroatom in MFI framework can be influenced to not only the acidic properties but also the catalytic activity of Mo/HZSM-5 for MDA. In this study, Al and Ga-, Al and B-containing MFI zeolites were synthesized with a series of Al/Ga, Al/B ratio. Various characterizations were performed to study the acidic properties of prepared samples. Moreover, the molybdenum oxide was impregnated on the prepared samples to investigate the effect of acidic properties and Mo anchoring on catalytic performance of MDA.