Ethylene oligomerization over bimetallic NiFe-BTC catalysts

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While linear α-olefins (LAOs) synthesis via selective ethylene oligomerization has been extensively studied, the selectivity control for C4-C8 LAOs over a heterogeneous catalyst remains an elusive goal. In this work, we propose a new and efficient catalyst design for the ethylene oligomerization; heterogeneous bimetallic Fe_xNi_{1-x}BTC framework (benzene-1,3,5-tricarboxylate). While Fe-BTC was ineffective in promoting the ethylene oligomerization, the incorporation of Fe in the Ni-BTC structure exerted large influence on the α-olefin selectivity. It was revealed that the Ni/Fe ratio played a crucial role in attaining a high α-olefin selectivity, and the activity and 1-C6 and 1-C8 selectivity reached as high as 230.5 $g.g_{Ni}^{-1}.h^{-1}$ and 15 wt%, respectively, in the presence of the bimetallic $Fe_{0.1}Ni_{0.9}$-BTC catalyst and MMAO at 60°C and 30 bar. The excellent selectivity demonstrates the potential application of MOF catalysts for the ethylene oligomerization.