

Inter conversion of light olefins on ZSM-5 in catalytic naphtha cracking condition

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The inter-conversion of light olefins over four types of HZSM-5 based catalysts under cracking conditions was investigated systematically and various methods including XRD, BET, NH₃-TPD, 27Al and 31P MAS-NMR were used to characterize the effects of P modification and steaming on ZSM-5. Regardless the types of catalyst, the same behaviors of light olefins inter-conversion were observed only depending on conversion of light olefins. Also, the conversion and selectivity were not influenced by the presence of hydrogen, suggesting that light paraffins were mainly produced from hydrogen transfer during cracking rather than hydrogenation of light olefins. It can be suggested that the inter-conversion of light olefins occurs through oligomerization of light olefins and then re-cracking of the oligomerized products. To guarantee high light olefins yield in catalytic naphtha cracking, it is strongly required to suppress oligomerization of light olefins during catalytic cracking.