

New Insights into the Mechanisms of Disproportionation of Aromatic Hydrocarbons over Large- and Medium-Pore Zeolites

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Zeolite-catalyzed disproportionation of aromatic hydrocarbons is among the most important petrochemical processes. For example, ethylbenzene disproportionation to benzene and the three diethylbenzene isomers is of particular importance, because para-diethylbenzene is a highly value-added species used as a desorbent for the recovery of p-xylene in UOP Parex and IFP Eluxyl processes. Also, trimethylbenzene disproportionation is one way for the production of xylenes, especially the para- and ortho-isomers, which are very much demanded compounds in the polymer industry. Here we report on the observation and identification of real reaction intermediates of these two disproportionation reactions over large- and medium-pore zeolites by gas chromatography/mass spectroscopy (GC/MS), which provides unprecedented insights into their mechanistic pathways.