

Comparison of intra- and inter-triads isomerization of dimethylnaphthalene over BEA zeolite

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There are ten different isomers of dimethylnaphthalene (DMN). For the selective production of 2,6-DMN, intra- or inter-triad isomerizations can be done using solid acid catalysts. It is known that the shift of methyl group from b to b position of naphthalene is more difficult than that of α to b position. In present work, the intra- and inter-triads isomerizations of dimethylnaphthalene and dimethyltetralin (DMT) were compared at various reaction conditions over BEA zeolite. It was found that the intra-triad isomerization of DMN was possible even at 200oC but for the inter-triad isomerization at least 250oC was required. However, in the case of DMT, inter- and intra-triad isomerization did not show difference in the reaction temperature and were possible even at 180oC. The isomerization activity was increased depending on the reaction temperature, but if the reaction temperature is higher than 300oC, the yield of 2,6-DMN decreased rapidly due to the side reactions such as cracking and transalkylation. It was also found that 2,6-DMN selectivity was strongly depend on the Si/Al ratio of BEA zeolite. The maximum 2,6-DMN selectivity was obtained at the Si/Al ratio of 12.5.