

## Effect of Hydrohalogenation of PtRe/H-ZSM-5 for Cyclohexene Conversion

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**摘要** Extended use of supported Pt catalysts causes thermal migration of Pt particles to form large agglomerates, thus decreasing the catalytic activity. The combination of Pt with Re protects Pt against migration. In addition, Cl<sup>-</sup> injection into the reactor assists Pt particles redispersion to prolong catalyst life. In this work, a PtRe/H-ZSM-5 catalyst was treated with either HCl or HF to investigate their role in activating or deactivating the catalyst. The conversion exceeded 90% in the whole temperature range with the PtRe/H-ZSM-5(HCl) catalyst, and its activity for the direct isomerization of cyclohexene to methylcyclopentenes (MCPEs) was the lowest but the activity for the hydrogenation of the MCPEs to methylcyclopentane was the highest. The reactivities of MCPEs and cyclohexadienes on the catalysts were similar because both are dehydrogenation reactions. Benzene production was significantly higher on the hydrochlorinated catalyst than on the other catalysts, and its hydrocracking activity was the lowest, which is a good characteristic for processing catalysts where cracking is undesired.

**关键词:**

**Abstract:** Extended use of supported Pt catalysts causes thermal migration of Pt particles to form large agglomerates, thus decreasing the catalytic activity. The combination of Pt with Re protects Pt against migration. In addition, Cl<sup>-</sup> injection into the reactor assists Pt particles redispersion to prolong catalyst life. In this work, a PtRe/H-ZSM-5 catalyst was treated with either HCl or HF to investigate their role in activating or deactivating the catalyst. The conversion exceeded 90% in the whole temperature range with the PtRe/H-ZSM-5(HCl) catalyst, and its activity for the direct isomerization of cyclohexene to methylcyclopentenes (MCPEs) was the lowest but the activity for the hydrogenation of the MCPEs to methylcyclopentane was the highest. The reactivities of MCPEs and cyclohexadienes on the catalysts were similar because both are dehydrogenation reactions. Benzene production was significantly higher on the hydrochlorinated catalyst than on the other catalysts, and its hydrocracking activity was the lowest, which is a good characteristic for processing catalysts where cracking is undesired.

**Keywords:**

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