

# Conversion of Methanol Using Modified H-MOR Zeolite Catalysts

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**摘要** The conversion of methanol was carried out over various mordenite zeolite catalysts to evaluate their catalytic performance. A post-preparation treatment of the H-MOR catalyst by halogenation with  $\text{NH}_4\text{Cl}$  or  $\text{NH}_4\text{F}$  and by hydrohalogenation with HCl or HF was carried out and its effect on methanol conversion reactions at 100 – 300 ° C in a continuous flow reactor was investigated. The as-synthesized H-mordenite (H-MOR) is generally more active during dimethyl ether (DME) production than the  $\text{NH}_4$ -MOR and Na-MOR. Fluorinated treatment with HF or  $\text{NH}_4\text{F}$  significantly improved the catalytic activity during methanol conversion and the formation of DME in comparison to chlorinated treatments with HCl or  $\text{NH}_4\text{Cl}$ . This is principally attributed to the higher Si/Al ratio and an increase in the number of acid sites and their strength. Halogenation treatment with the acids of both  $\text{F}^-$  or  $\text{Cl}^-$  gave the highest conversion activity for DME production compared to halogenation treatments with the salts of the same halogens. Zeolite dealumination by the acids was more profound than that by the halogen ion salts, which resulted in a decrease in the crystallinity and crystallite sizes of the zeolite.

**关键词:** [methanol conversion](#) [H-MOR](#) [halogenation](#) [hydrohalogenation](#)

**Abstract:** The conversion of methanol was carried out over various mordenite zeolite catalysts to evaluate their catalytic performance. A post-preparation treatment of the H-MOR catalyst by halogenation with  $\text{NH}_4\text{Cl}$  or  $\text{NH}_4\text{F}$  and by hydrohalogenation with HCl or HF was carried out and its effect on methanol conversion reactions at 100 – 300 ° C in a continuous flow reactor was investigated. The as-synthesized H-mordenite (H-MOR) is generally more active during dimethyl ether (DME) production than the  $\text{NH}_4$ -MOR and Na-MOR. Fluorinated treatment with HF or  $\text{NH}_4\text{F}$  significantly improved the catalytic activity during methanol conversion and the formation of DME in comparison to chlorinated treatments with HCl or  $\text{NH}_4\text{Cl}$ . This is principally attributed to the higher Si/Al ratio and an increase in the number of acid sites and their strength. Halogenation treatment with the acids of both  $\text{F}^-$  or  $\text{Cl}^-$  gave the highest conversion activity for DME production compared to halogenation treatments with the salts of the same halogens. Zeolite dealumination by the acids was more profound than that by the halogen ion salts, which resulted in a decrease in the crystallinity and crystallite sizes of the zeolite.

**Keywords:** [methanol](#), [conversion](#), [H-MOR](#), [halogenation](#), [hydrohalogenation](#)

收稿日期: 2010-10-19; 出版日期: 2010-12-27

引用本文:

.Conversion of Methanol Using Modified H-MOR Zeolite Catalysts[J] 催化学报, 2011,V32(3): 412-417

.Conversion of Methanol Using Modified H-MOR Zeolite Catalysts[J] , 2011,V32(3): 412-417

链接本文:

[http://www.chxb.cn/CN/10.1016/S1872-2067\(10\)60187-8](http://www.chxb.cn/CN/10.1016/S1872-2067(10)60187-8) 或 <http://www.chxb.cn/CN/Y2011/V32/I3/412>

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