

催化、动力学与反应器

## 蜡油催化裂化过程中的苯生成反应途径

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摘要

以大庆减压蜡油(VGO)为原料,采用不同类型分子筛催化剂在小型固定流化床装置上考察了催化裂化过程中苯生成的两条重要途径——芳烃迁移和芳烃生成反应。在Y分子筛催化剂上,从芳烃迁移反应向芳烃生成反应的过渡大约发生在转化率30%附近,芳烃迁移和芳烃生成反应对苯生成的贡献分别约为36%和64%,原料中约5%的烷基苯会发生脱烷基反应生成苯。在ZSM-5分子筛催化剂上,从芳烃迁移反应向芳烃生成反应的过渡大约发生在转化率55%附近,芳烃迁移和芳烃生成反应对苯生成的贡献分别约为20%和80%,原料中约10%的烷基苯会发生脱烷基反应生成苯。通过芳烃生成反应产生的苯与汽油芳烃的比值基本维持一恒定值,而不随转化率变化,但该比值与催化剂的分子筛类型有关。大庆VGO在转化率75%左右会发生苯消耗反应。反应温度会对苯的生成产生影响。

关键词

[减压蜡油](#) [催化裂化](#) [苯](#) [生成途径](#) [转化](#)

分类号

## Benzene formation routes in VGO catalytic cracking

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### Abstract

Daqing vacuum gas oil(VGO) was catalytically cracked over catalysts of different zeolite types in a small FFB (fixed fluid bed) unit to study the aromatics shift and aromatics generation which are two important routes of benzene formation in the catalytic cracking process. With the Y zeolite the turning point from aromatics shift to aromatics generation happened at the conversion of about 30%. The respective contributions to benzene formation from aromatics shift and aromatics generation were about 36% and 64%, and the dealkylation of about 5% of alkylbenzene present in the feed was also helpful to form benzene. Accordingly with the ZSM-5 zeolite the turning point happened at the conversion of about 55%, the respective contributions were about 20% and 80%, and dealkylation of about 10% of alkylbenzene present in the feed was helpful to form benzene. The ratio of benzene to aromatics originating from aromatics generation was basically constant, not varying with conversion, but it was closely relevant to the type of zeolites. Some of the benzene formed by reactions was again consumed at the conversion of about 75% during Daqing VGO cracking. Reaction temperature had an important effect on the formation of benzene.

### Key words

[vacuum gas oil](#) [catalytic cracking](#) [benzene](#) [formation routes](#) [conversion](#)

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