

催化、动力学与反应器

催化裂化汽油中特征硫化物噻吩的催化氧化脱硫

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摘要 以负载金属铈的分子筛为催化剂,在H₂O₂-HCOOH体系中,对催化裂化(FCC)汽油中特征硫化物噻吩(C₄H₄S)的正庚烷溶液进行了氧化脱硫研究。考察了氧化剂用量、溶剂、氧化时间、氧化温度、相转移剂等因素对噻吩脱除效果的影响,并对噻吩的氧化反应历程进行了初步的探讨。实验结果表明:以负载金属铈的分子筛为催化剂,在反应温度50℃,反应60min, H₂O₂:S=10:1(mol/mol), H₂O₂:HCOOH=1:1(V/V)的条件下,正庚烷溶液C₄H₄S的脱除率达到了78.2%,加入乳化剂OP可使C₄H₄S的脱硫率达到94.5%,但四丁基溴化胺(TBAB)的加入使氧化后的样品中出现了噻吩的溴代产物。

关键词 [噻吩](#); [氧化脱硫](#); [反应历程](#); [催化裂化汽油](#)

分类号

Oxidative desulfurization of thiophene in fluid catalytic cracking gasoline

Abstract

Thiophene(C₄H₄S) is a typical sulfur-containing compound in fluid catalytic cracking(FCC) gasoline. Oxidative desulfurization of C₄H₄S in n-heptane solution was conducted with hydrogen peroxide (H₂O₂) and formic acid over a catalyst of 5A molecular sieve loaded with ceria. The effects of oxidative agent, solvent, reaction temperature as well as the addition of phase transfer catalyst were investigated in detail. The reaction course of oxidative desulfurization of C₄H₄S was preliminarily studied. The oxidation of C₄H₄S was achieved under mild reaction conditions and it was easy to raise the reaction temperature or increase the reaction time to achieve high oxidation conversions. The results showed that the conversion of C₄H₄S in n-heptane solution was 78.2% under the condition of reaction temperature of 50℃, n H₂O₂:n S=10:1, V H₂O₂:V HCOOH =1:1. The conversion of C₄H₄S was 94.5% when an emulsifier OP was added to this system. However, with the addition of tetrabutylammonium bromide (TBAB), a bromine substitution product appeared in the oxidation of C₄H₄S.

Key words [thiophene](#) [oxidative desulfurization](#) [reaction course](#) [fluid catalytic cracking gasoline](#)

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