

加工工艺

甲醇钙催化菜籽油酯交换反应制备生物柴油的研究

刘学军¹;朴香兰²;王玉军¹;朱慎林¹

清华大学¹

清华大学化工系²

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摘要 本文研究了甲醇钙固体碱催化剂催化菜籽油和甲醇酯交换反应制备生物柴油, 实验分析了甲醇钙的比表面积、总孔容、平均孔径、热稳定性和表面碱性, 然后分析了甲醇钙固体碱催化酯交换反应制备生物柴油的反应机理, 再通过改变实验条件研究了反应温度、催化剂用量和醇油体积比对生物柴油产率的影响。实验结果表明: 甲醇钙热稳定性好, 碱性强; 当催化剂用量为菜籽油质量的2.0%, 反应温度为60℃, 醇油体积比为1: 1时, 反应2小时后生物柴油产率达到了96.8%。

关键词 [甲醇钙](#) [生物柴油](#) [脂肪酸甲酯](#) [酯交换](#) [固体碱](#)

分类号

Transesterification of rapeseed oil to biodiesel using calcium methoxide catalyst

PIAO Xiang-Lan

Abstract

Transesterification of rapeseed oil to biodiesel with methanol using calcium methoxide as a solid base catalyst was investigated. The surface area, total pore volume, average pore diameter and thermal stability of calcium methoxide catalyst were measured. The effects of various parameters, such as reaction temperature, mass ratio of catalyst to oil and molar ratio of methanol to oil on the biodiesel yield was studied and the reaction conditions were optimized. The results showed that calcium methoxide exhibited strong basicity and good thermal stability. Under the optimal reaction conditions of a molar ratio of methanol to oil of 22, a catalyst dosage of 2.0%, a reaction temperature of 65℃ and a reaction time of 2.5 h, the yield of obtained biodiesel reached 95%.

Key words [calcium methoxide](#) [biodiesel](#) [fatty acid methyl ester \(FAME\)](#) [transesterification](#) [solid base](#).

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通讯作者 刘学军 liuxj05@mails.tsinghua.edu.cn;deliuxj05#@

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