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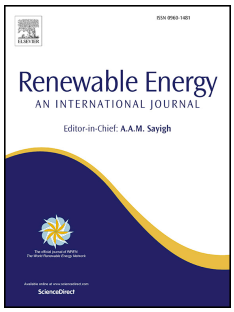

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Cucurbituril-protected $Cs_{2.5}H_{0.5}PW_{12}O_{40}$ for optimized biodiesel production from waste cooking oil

Lu Li, Changjun Zou*, Lu Zhou, Lang Lin

School of Chemistry and Chemical Engineering; Southwest Petroleum University; Chengdu City; China.

* Corresponding author: School of Chemistry and Chemical Engineering, Southwest Petroleum University, No.8 Xindu Avenue, Xindu Distict, Chengdu City, 610500, PR China. Tel.: +86 02883037327; Fax: +86 02883037305; E-mail: changjunzou@126.com

Abstract:

In this research, transesterification of waste cooking oil has been studied. The cucurbit[7]uril-protected $Cs_{2.5}H_{0.5}PW_{12}O_{40}$ (CsPW-CB[7]) is prepared as a highly efficient catalyst for the direct biodiesel production via the transesterification of waste cooking oil. The CsPW-CB[7] is characterized by X-ray diffraction, FT-IR. Besides, response surface methodology (RSM) was used to optimize the operating parameters on the conversion rate of waste cooking oil. In addition, the maximum conversion rate could reach 95.1% under the optimum experimental conditions that are catalyst of 2 wt%, methanol/oil molar ratio of 11: 1, reaction time of 150 min and temperature of 70 ^{o}C. According to the assumption of pseudo-first order reaction, the activation energy of the reaction was calculated as 36.0 kJ·mol^{-1}, indicating the reaction is easy to react. The physicochemical properties of biodiesel product could reach the ASTM D6751 standard. The results indicated that the CsPW-CB[7] catalyst showed good