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The structure, properties and transesterification catalytic activities of the calcium glyceroxide

Anton Esipovich^{a,b}, Anton Rogozhin^a, Sergey Danov^a, Artem Belousov^{a,*}, Evgeny Kanakov^a

^a*Nizhny Novgorod State Technical University n.a. R.E. Alekseev, 49 Gaidar Street, Dzerzhinsk, 606026, Russian Federation.*

^b*Lobachevsky State University of Nizhny Novgorod, 23 Gagarin Avenue, Nizhny Novgorod, 603950, Russian Federation.*

*Corresponding author. Tel: +7 987 749 2514.

E-mail addresses: *artem_belousov17@mail.ru* (A. Belousov), *margyn@yandex.ru* (A. Esipovich), *anton.dpi@yandex.ru* (A. Rogozhin), *kan-evg@mail.ru* (E. Kanakov)

Abstract

In this study, the physical properties of calcium glyceroxide were investigated. Using IR, XRD and NMR spectroscopy, it was showed that calcium glyceroxide has a polymeric structure with –CaOCH₂–CHOH–CH₂O– links. The general regularities of the rapeseed oil transesterification in the calcium glyceroxide presence were studied. It was found that calcium glyceroxide is soluble in the reaction medium, and the rapeseed oil transesterification passes through a homogeneous catalytic mechanism. Based on the obtained experimental data the process mathematical model was developed and the optimal conditions of the transesterification in the calcium glyceroxide presence calcium glyceroxide were determined. The calcium glyceroxide using as transesterification catalyst providing the FAMES yield of 96% at optimal conditions.

Keywords: Biodiesel, Transesterification, Calcium glyceroxide, Kinetics, Mathematical model

Abbreviations

GPC - gel permeation chromatography

FAMES – fatty acid methyl esters, biodiesel

MG – monoglyceride

DG – diglyceride

TG – triglyceride

ML – methanol

GLY – glycerol

FFA – free fatty acids

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