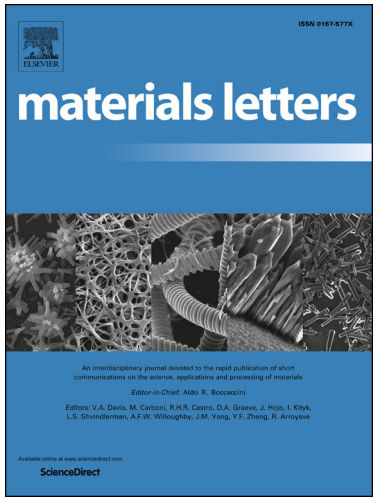

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Hydrothermal synthesis of Cobalt (II) 3D Metal-Organic Framework acid catalyst applied in the transesterification process of vegetable oil.

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Abstract

Biodiesel obtained from vegetable oils is considered a renewable fuel and because of its environmental advantages and low cost it is in sight of many investigations all around the world. This work discusses the application of a new metal-organic framework (MOF) on the ultrasonic-assisted transesterification process of Erythrina Mexicana oil. The new heterogeneous catalyst cobalt (II) metal-organic framework MOF (**1**), was synthesized by the hydrothermal reaction of $Co(NO_3)_2 \cdot 6H_2O$, 1,2-di-(4-pyridyl)-ethylene (**L1**) and 5-Nitroisophthalic acid (**L2**) in water at 160° C. Monocrystal x-ray diffraction method was employed to determine the molecular structure. The reaction to obtain biodiesel was carried out in an ultrasonic bath and finished in methanol at 60° C and to determine and quantify the oil composition the Gas Chromatography (GC) method was employed, supported by ^{1}H and ^{13}C NMR spectroscopy. Finally, five fatty acid methyl esters were found in the composition of *Erythrina mexicana* oil.

1. Introduction

Transesterification process of any triglyceride source such as animal fats, alga lipids or oil, give place to the formation of biodiesel fuel and mainly two different types of catalyst are used in the transesterification process, homogeneous catalysis, where the solution of reactants and the catalyst are in the same phase and heterogeneous catalysis which imply that the catalyst is in a different phase than the other components [1]. The principal advantage of using heterogeneous catalyst lies in the fact that low cost is achieved by easy separation and