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Heterogeneous Catalytic Transformation of Vegetable Oils into Biodiesel in One-step Reaction using Super Acidic Sulphonated Modified Mica Catalyst

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Abstract

Herein, conversion of *castor* oil and *jatropha* oil were converted into their corresponding biodiesels using highly acidic heterogeneous catalyst prepared by modification of silane mica clay in one step reaction. The prepared catalyst was characterized using different spectroscopic methods. The conditions of biodiesel production were optimized to obtain the maximum yield including: oil to methanol ratio, catalyst ratio, temperature, and reaction time. The specifications of the obtained products were comparable to (American Society for Testing and Materials) ASTM specifications. The analysis showed that the conversion of *castor* oil into biodiesel involves two reactions. The first is the transesterification of the triglycerides to the corresponding methyl esters, and the second is the etherification reaction of the hydroxyl groups of ricinoleate moieties to the corresponding methyl ether. The role of catalyst activity in the conversion reactions was described, and the different mechanisms involved in the conversion reaction were described.

Key words

Acidic catalyst; heterogeneous; *castor* oil; *jatropha* oil; biodiesel.

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