



Conversion of Jatropha Oil to Green Hydrocarbons through Decarboxylation Process over Mesohydrotalcite Catalyst

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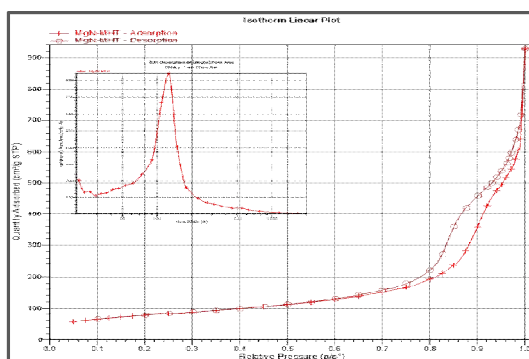
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ABSTRACT

Vietnamese jatropha oil was converted to rich green hydrocarbon products under batch decarboxylation conditions using novel mesoporous Mg-Al-Co hydrotalcite based catalyst (mesohydrotalcite catalyst). The catalyst having pore width of 130Å was modified to other ones with pore width of 38Å by changing its preparation method from co-condensation-evaporation to hydrothermal treatment. The narrower pore width of the catalyst greatly contributed to its selectivity with free fatty acids in the decarboxylation process, which positively enhanced the hydrocarbon products. The decarboxylation parameters including temperature, time, catalyst loading and stirring speed were investigated in order to improve productivity of hydrocarbons within boiling range of diesel fraction. Results of the decarboxylation process showed a very high yield of ~70% of the diesel fraction strongly proving great activity and selectivity of the mesohydrotalcite catalyst. Some other techniques including WAXRD, TEM, BET, CO₂-TPD and NH₃-TPD were also applied to characterize some important properties of the mesohydrotalcite catalyst. They were all evidences for convincing the catalyst ability in the production of biofuel from renewable sources.

Graphical Abstract



Adsorption-desorption isotherm and pore distribution against pore area of MHT-HT catalyst

Highlights

- Preparing mesoporous hydrotalcite based catalyst containing both homogeneous pore channels.
- Narrowing the catalyst pore width from 130Å to 38Å by changing preparation method from

co-condensation evaporation to hydrothermal treatment.

- Establishing decarboxylation of jatropha oil in batch process obtaining green hydrocarbons.
- Yielding 70% of high purity green hydrocarbons in diesel fraction.

Keywords: Mesoporous hydrotalcite, Decarboxylation, Jatropha oil, Hydrothermal, Pore control.
