

Optimization of Biodiesel Production from Palm Oil over Mg-Al Modified K-10 Clay Catalyst

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Abstract : Biodiesel which comes from pure renewable resources provide an alternative fuel option for future because of limited fossil fuel resources as well as environmental concerns. The transesterification of vegetable oils for biodiesel production is a promising process to overcome this future crises of energy. The use of heterogeneous catalysts greatly simplifies the technological process by facilitating the separation of the post-reaction mixture. The purpose of the present work was to examine a heterogeneous catalyst, in particular, Mg-Al modified K-10 clay, to produce methyl esters of palm oil. The prepared catalyst was well characterized by different latest techniques. In this study, the transesterification of palm oil with methanol was studied in a heterogeneous system in the presence of Mg-Al modified K-10 clay as solid base catalyst and then optimized these results with the help of Design of Experiments software. The results showed that methanol is the best alcohol for this reaction condition. The best results was achieved for optimization of biodiesel process. The maximum conversion of triglyceride (88%) was noted after 8 h of reaction at 60°C, with a 6:1 molar ratio of methanol to palm oil and 3 wt % of prepared catalyst.

Keywords : palm oil, transesterification, clay, biodiesel, mesoporous clay, K-10

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