

ABSTRACT

DEVELOPMENT OF SYNTHETIC ZEOLITE SILICA FROM RICE HUSK SILICA USING ELECTROCHEMICAL METHOD AS A CATALYST FOR PROCESSING OF VEGETABLE OIL TO BIODIESEL

By

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In this study, a series of synthetic zeolites synthesized from rice husk silica and aluminum metal using an electrochemical method was tested with the potential variations in pH and then tested for transesterification of coconut oil and castor oil. Catalysts with different Si/Al ratios were prepared through application of different pHs and potentials, and the catalysts were subjected to calcination treatments at 300 and 500 °C before use. The results of transesterification experiments revealed that the best catalyst for transesterification of coconut oil was the catalyst prepared at pH 10 and potential 8 volt, calcined at 300 °C, with the yield of 94%. For castor oil, the best catalyst was that prepared at pH 10 and potential 10 volt, calcined at 500 °C, with the yield of 98%. The conversion of fatty acids in oils into corresponding methyl esters were confirmed using GC-MS method. Characterizations of the best catalysts for transesterification of coconut oil indicate the particle size distribution from 172 to 252.6 nm, and from 901.9 to 1399.7 nm for the best catalyst for transesterification of castor oil. The XRD data showed the presence of albite and nepheline phases.

Keyword : Electrochemical, rice husk, albite, nepheline, transesterification, synthetic zeolite.