ABSTRACT

PREPARATION OF CaO/SiO_2 CATALYSTS FROM $CaCO_3$ AND RICE HUSK SILICA USING SOL GEL METHOD FOR TRANSESTERIFICATION OF PALM OIL INTO BIODIESEL

By

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In this research a series of CaO/SiO_2 catalysts was synthesized from $CaCO_3$ and rice husk silica using sol gel method, and subsequently tested for transestrification of palm oil with methanol. Catalysts with different CaO contents of 5, 10, 15, 20, 25% relative to silica were prepared and calcined at 600 ^oC for 4 hours before use. Transesetrification results showed that all catalysts possess high activity, and the best performance was exhibited by the catalysts with CaO content of 20%, this particular catalyst produced the yield of 98,24% from the experiment carried out with mole ratio of oli to methanol of 1:4, reaction time of 4 hours, and 5% mass of catalysts to oil used. Characterization of the transesterification product with GC-MS indicate the presence of seven fatty acid methyl esters that correspond to the with fatty acids composing the palm oil. Characterization of the catalysts with PSA technique revealed the existence of two groups, in which the first group has particle size range between 9,59-68,84 µm, and the second group has a particle size range between 68,84-494,17 µm. Catalysts with the best performance was characterized by FTIR, SEM-EDS, and XRD techniques.

Key words : catalysts CaO/SiO_2, sol gel method, transesterification palm oil, biodiesel