ABSTRACT

CONVERSION OF USED ALUMINUM CANS AND RICE HUSK SILICA INTO ALUMINOSILICATE USING ELECTROCHEMICAL METHOD AS CATALYST FOR TRANSESTERIFICATION OF RUBBER SEED OIL

By

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In this study a series of aluminosilicate catalysts was synthesized from used aluminum cans and rice husk silica using electrochemical method. Preparation of the catalysts was carried out by electrolysis of the cans in silica sol at pH 10.0 for different times of 1, 2, and 3 hours at potential 8, 10, and 12 volt. Aluminosilicate was calcined at 600 °C for 4 hours and then tested for transesterification of rubber seed oil. The experimental results showed that all catalysts were able to work although with a low yield, that is 24.93-29.39%. Characterization of transesterification products with GC-MS indicates the presence of five fatty acid methyl esters with methyl linoleic as the most abundant (36.80%), in accordance with the existence of linoleic acid as the main component of the rubber seed oil. Characterization of catalysts with XRD showed that catalysts still amorphous phase, with the surface marked with the presence of pores and clusters with different sizes and shapes based on SEM technique, and in agreement with particle size distribution as seen by PSA technique. The result of EDS technique revealed the existence of elements includes O, Si, Al, Na, C, Mg, Mn, Br, and F and characterization with XRF showed that mayor compounds in the catalysts are Al₂O₃ and SiO₂, with several minor elements most likely originated from aluminum cans and rice husk.

Keywords : Aluminum cans, aluminosilicate catalysts, electrochemical method, transesterification, rubber seed oil.