ABSTRACT

THE EFFECT OF MASS VARIATION THROUGH FUNCTIONAL AND THERMAL CHARACTERISTICS OF MgO-SiO₂ COMPOSITE BASED SILICA RICE HUSK SILICA AS A CATALYST

By

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This study was carried out to study functionality and thermal properties of MgO-SiO₂ composites, with different composition (mass) as MgO : SiO₂ of 40:60, 50:50 and 60:40. The composites were prepared from magnesium nitrate hexahydrate as the source of MgO and rice husks silica, using sol-gel method. Before characterization, the sample was subjected to sintering treatment at 900 °C. The composites were characterized using FTIR, DTA/TGA, and the activity as catalyst was tested for transesterification of coconut oil. The FTIR analyses revealed that the main functional groups present in the samples are Si-O-Si, Mg-O-Si and Mg-O. It is also found that increased amount of MgO resulted in an increased formation of Mg-O-Si and Mg-O groups, while Si-O-Si group decreased. The results of DTA/TGA analyses showed that the sample experienced endothermic and exothermic reactions. The heat absorption (endothermic) occurred easier along with the addition of MgO mass but thermal stability was achieved by the sample with the highest mass of silica which is marked by insignificant mass loss. Transesterification test indicate that the MgO-SiO₂ composite function as catalyst, converting the coconut oil into fatty acid methyl ester (FAMEs), including methyl laurate, methyl miristate and methyl palmitate

Key words: rice husks, MgO-SiO₂, sol-gel, FTIR, DTA/TGA.