



## Preparation of Cellulose Based Catalyst for Converting Rubber Seed Oil to Biodiesel

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Accepted on 22<sup>nd</sup> July 2016

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### ABSTRACT

*Cellulose based catalyst was prepared through a two-step procedure including partial cellulose carbonization at 400°C for 2 h to obtain “black powder” and sulfonation of the black powder using concentrated sulfuric acid at 230°C for 16 h to synthesize the catalyst. The as-synthesized catalyst possessed super acid sites assigned for –SO<sub>3</sub>H groups located on polycyclic aromatic fragments enhancing its activity on methanolysis of a wide range of vegetable oils and animal fats. In this study, the activity of the catalyst were demonstrated on Vietnam rubber seed oil containing a large amount of free fatty acid in its chemical composition for synthesizing the fatty acid methyl esters (FAMES) known as biodiesel. The methanolysis were established at 130°C in an autoclave reactor, and the reaction reached a yield of 95.8% after 4 h. The FAME content in the final product was 100% giving favorite characteristics for using in diesel engine according to the ASTM D 6751. Some techniques were applied such as XRD, FT-IR, EDX and TPD-NH<sub>3</sub> for characterizing the structure, element composition, functional group vibrations and acidity of the catalyst. The FAME composition was determined by GC-MS method.*

**Keywords:** Carbon based catalyst, partial carbonization, cellulose catalyst, biodiesel, rubber seed oil.

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