

Preparation and Characterization of Supported Metal Nanocrystal Using Simple Heating Method for Renewable Diesel Synthesis from Nyamplung Oil (Calophyllum inophyllum Oil)

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Abstract : Indonesia's needs of diesel oil each year are increasing and getting urge. However, that problems are not supported by the amount of oil production that still low and also influenced by the fact of oil reserve is reduced. Because of that, the government prefers to import from other countries than fulfill the needs of diesel. To anticipate that problem, development of fuel based on renewable diesel is started. Renewable diesel is renewable alternative fuel that is hydrocarbon derivative from decarbonylation of non-edible oil. Indonesia is rich with natural resources, including nyamplung oil (Calophyllum inophyllum oil) and zeolite. Nyamplung oil (Calophyllum inophyllum oil) has many stearic acids which are useful on renewable diesel synthesis meanwhile zeolite is cheap. Zeolite is many used on high temperature reaction and cracking process on oil industry. Zeolite also has advantages which are a high crystallization, surface area and pores. In this research, the main focus that becomes our attention is on preparation and characterization of metal nanocrystal. Active site that used in this research is Nickel Molybdenum (NiMo). The advantage of nanocrystal with nano scale is having larger surface area. The synthesis of metal nanocrystal will be done with conventional preparation modification method that is called simple heating. Simple heating method is a metal nanocrystal synthesis method using continuous media which is polymer liquid. This method is a simple method and produces a small particles size in a short time. Influence of metal nanocrystal growth on this method is the heating profile. On the synthesis of nanocrystal, the manipulated variables are temperature and calcination time. Results to achieve from this research are diameter size on nano scale (< 100 nm) and uniform size without any agglomeration. Besides that, the conversion of synthesis of renewable diesel is high and has an equal specification with petroleum diesel. Catalyst activities are tested by FT-IR and GC-TCD on decarbonylation process with a pressure 15 bar and temperature 375 °C. The highest conversion from this reaction is 35% with selectivity around 43%.

Keywords : renewable diesel, simple heating, metal nanocrystal, NiMo, zeolite

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