

## INTISARI

### **SINTESIS KATALIS NiMCM-41 DAN Ni/NiMCM-41 SERTA UJI APLIKASINYA UNTUK PERENKAHAN MINYAK KELAPA**

oleh

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Telah dilakukan sintesis material NiMCM-41 dan Ni/NiMCM-41 serta uji pemakaiannya untuk konversi minyak kelapa menjadi *biofuel*. Sintesis material NiMCM-41 menggunakan *cetiltrimetilammonium bromida* (CTAB) dan tetrametilamonium hidroksida (TMAOH) sebagai *template*, natrium silikat dan natrium alumina berturut-turut sebagai sumber silika dan alumina. Campuran diproses secara hidrothermal pada suhu 100 °C selama 12 jam, dicuci sampai netral kemudian dikeringkan. *Template* dihilangkan dengan kalsinasi pada 540 °C. Selanjutnya NiMCM-41 dibuat menjadi Ni/NiMCM-41 dengan metode impregnasi basah. Hasil sintesis dianalisis dengan *Forier Transform Infrared* (FTIR), *X-ray Diffraction* (XRD), *Atomic Absorption Spectrophotometer* (AAS), *Transmission Electron Microscope* (TEM) dan adsorpsi gas nitrogen dengan metode Brunauer-Emmet-Taylor (BET), sedangkan karakterisasi terhadap produk perengkahan dilakukan dengan menggunakan *Gas Liquid Chromatography – Mass Spectrometer* (GC-MS).

Hasil analisis menggunakan XRD dan TEM menunjukkan bahwa dalam NiMCM-41, Ni berada dalam kerangka dan membentuk pori heksagonal. Ukuran pori, diameter dan luas area material NiMCM-41 > Ni/NiMCM-41. Keasaman NiMCM-41 > Ni/NiMCM-41. Perengkahan minyak kelapa menggunakan katalis NiMCM-41 menghasilkan nilai konversi total 63,833% dan selektivitas terhadap fraksi bensin 43,816%, sedangkan perengkahan menggunakan katalis Ni/NiMCM-41 menghasilkan nilai konversi total dan selektivitas terhadap bensin berturut-turut 60,862% dan 30,405%.

Kata kunci: NiMCM-41, Ni/NiMCM-41, perengkahan, biofuel, minyak kelapa

## ABSTRACT

### **SYNTHESES OF NiMCM-41 AND Ni/NiMCM-41 CATALYSTS AND THEIR APPLICATION TESTING FOR CRACKING OF COCONUT OIL**

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The syntheses of material of NiMCM-41 and Ni/NiMCM-41, and their application testing for conversion of coconut oil into biofuel have been performed. The synthesis of material NiMCM-41 used cetyltrimethylammonium bromide (CTAB) and tetramethyl-ammonium hydroxide (TMAOH) as a template, sodium silicate and sodium alumina as the sources of silica and aluminium, respectively. The mixture was processed by hydrothermal method at 100 °C for 12 hours, washed until neutral, and it was then dried. The template was eliminated from the material by calcination at 540 °C. NiMCM-41 was then modified as Ni/NiMCM-41 by impregnation method. The products were then characterized by *Forier Transform Infrared* (FTIR), *X-ray Diffraction* (XRD), *Atomic Absorption Spectrophotometer* (AAS), *Transmission Electron Microscope* (TEM) and nitrogen gas adsorption by method of Brunauer-Emmet-Taylor (BET), while product of cracking was characterized by using *Gas Liquid Chromatography – Mass Spectrometer* (GC-MS).

The TEM and XRD analyses results showed that in NiMCM-41, Ni was incorporated in the porous heksagonal framework. The diameter, pore size, surface area and acidity of NiMCM-41 were higher than that of Ni/NiMCM-41. Yield of the cracking of coconut oil using NiMCM-41 catalyst showed that total conversion was 63,833%, and selectivity to biogasoline was 43,816%, while using Ni/NiMCM-41, total conversion and selectivity were 60,862% and 30,405%, respectively.

Keywords: NiMCM-41, Ni/NiMCM-41, cracking, biofuel, coconut oil