

**Ningsih, A., 2019, Preparasi dan Karakterisasi Katalis Zn<sup>2+</sup>-Mordenit untuk Sintesis *Biogasoline* dari Asam Palmitat, Skripsi di bawah bimbingan Dr. Abdulloh, S.Si., M.Si dan Harsasi Setyawati, S.Si., M.Si., Departemen Kimia, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya.**

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### ABSTRAK

Telah dilakukan penelitian preparasi dan karakterisasi katalis Zn<sup>2+</sup>-mordenit untuk sintesis *biogasoline* dari asam palmitat. Preparasi Zn<sup>2+</sup>-mordenit dilakukan melalui metode *cation exchanged* dengan larutan ZnSO<sub>4</sub> 1 N pada mordenit alam Turen Malang. Karakterisasi katalis dilakukan dengan menggunakan XRD, XRF, FTIR, analisis keasaman menggunakan piridin-FTIR dan adsorpsi-desorpsi N<sub>2</sub>. Uji aktivitas katalis dilakukan dengan metode *fractionated cracking* pada suhu 300°C selama 1, 2 dan 3 jam. Karakterisasi produk reaksi dilakukan berdasarkan hasil analisis menggunakan GC-MS. Hasil karakterisasi menunjukkan bahwa katalis memiliki kristalinitas yang tinggi, mengandung logam Zn<sup>2+</sup> sebesar 12,1%, memiliki jumlah situs asam *Brønsted* sebesar 0,0707 mmol/g dan asam *Lewis* sebesar 0,2323 mmol/g, serta memiliki luas permukaan sebesar 35,12 m<sup>2</sup>/g dan termasuk ke dalam mesopori dengan ukuran sebesar 9,15 nm. Katalis Zn<sup>2+</sup>-mordenit memiliki aktivitas katalis yaitu mampu mengkonversi asam palmitat hampir 100%, produk hidrokarbon sebesar 96% dengan selektivitas sebesar 96%, senyawa *biogasoline* sebesar 7,48% dengan selektivitas 7,48% dan senyawa C<sub>15</sub> sebesar 60,65% dengan selektivitas 60,65% pada reaksi selama 3 jam. Senyawa *biogasoline* yang dihasilkan adalah etilbenzena dan dodekana.

Kata kunci: Zn<sup>2+</sup>-mordenit, *cation exchanged*, *catalytic cracking*, asam palmitat dan *biogasoline*

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### ABSTRACT

Has been done the research about preparation and characterization of Zn<sup>2+</sup>-mordenite catalyst for *biogasoline* synthesis from palmitic acid. Preparation of Zn<sup>2+</sup>-mordenite has been done by cation exchanged of ZnSO<sub>4</sub>.7H<sub>2</sub>O 1 N solution on natural mordenite from Turen Malang. The catalyst was characterized by XRD, XRF, FTIR, acidity analysis using pyridine-FTIR and N<sub>2</sub> adsorption-desorption. The activity of catalyst was carried out by a fractionated *cracking* method at a temperature of 300°C for 1, 2 and 3 hours. The product of reaction was analyzed by GC-MS. The results which showed a high crystallinity of catalyst, containing Zn<sup>2+</sup> of 12,1%, a Brønsted acid has site amount of 0,0707 mmol/g and Lewis acid of 0,2323 mmol/g, surface area amount of 35,12 m<sup>2</sup>/g and included in mesopores with a size of 9,15 nm. Zn<sup>2+</sup>-mordenite catalyst showed the activity is 100% conversion of palmitic acid, obtained hydrocarbon product of 96% with selectivity of 96%, obtained *biogasoline* product of 7,48% with the selectivity of 7,48% and C<sub>15</sub> product of 60,65% with selectivity 60,65% in the reaction of 3 hours. The results of *biogasoline* compounds were ethylbenzene and dodecane.

Key words: Zn<sup>2+</sup>-mordenite, cation exchanged, catalytic *cracking*, palmitic acid and *biogasoline*