

**PENGARUH SUSUNAN KATALIS Ni DAN Mo TEREMBAN PADA  
H-MORDENIT DALAM REAKTOR TERHADAP SELEKTIVITAS  
DAN YIELD BIOAVTUR HASIL *HYDROTREATMENT*  
MINYAK SAWIT**

Sintia Ayuningdewi  
20/45925/PA/19986

**INTISARI**

Preparasi katalis berbasis logam Ni dan Mo yang diembankan pada H-mordenit melalui metode impregnasi kering telah dilakukan. Tujuan dari penelitian ini adalah mempelajari karakteristik dan pengaruh susunan katalis Ni/Mor dan/atau Mo/Mor terhadap selektivitas dan *yield* bioavtur dalam *hydrotreatment* minyak sawit. Impregnasi dilakukan dengan cara semprot (*spray*) menggunakan larutan prekursor  $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$  dan  $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ . Katalis dikarakterisasi menggunakan instrumen FTIR, XRD, SEM-EDX, SAA, dan  $\text{NH}_3$ -TPD. Uji aktivitas katalis dilakukan melalui *hydrotreatment* minyak sawit menggunakan reaktor *semi-batch* dengan pemanas ganda dalam sistem *one-pot double-decker*. Produk cair hasil *hydrotreatment* dianalisis menggunakan instrumen GC-MS. Katalis dengan hasil selektivitas dan *yield* bioavtur tertinggi dianalisis dengan FTIR.

Hasil penelitian menunjukkan katalis Ni/Mor dan Mo/Mor menunjukkan karakter luas permukaan masing-masing sebesar 318,32 dan 337,22  $\text{m}^2/\text{g}$ ; volume pori total sebesar 0,21 dan 0,22  $\text{cm}^3/\text{g}$ ; diameter pori rata-rata sebesar 2,55 dan 2,52 nm; serta keasaman total 1,81 dan 2,25 mmol/g. Umpan minyak sawit mengandung senyawa dominan asam oleat (44,38%) dan asam palmitat (39,90%). Katalis Ni/Mor susun tunggal menghasilkan selektivitas dan *yield* bioavtur tertinggi sebesar 88,45% dan 28,58%.

Kata kunci: bioavtur, *hydrotreatment*, impregnasi, mordenit.

***THE EFFECT OF ARRANGEMENT OF Ni AND Mo CATALYSTS  
SUPPORTED ON H-MORDENITE IN A REACTOR TOWARDS  
SELECTIVITY AND YIELD OF BIOAVTUR FORM  
HYDROTREATMENT OF PALM OIL***

Sintia Ayuningdewi  
20/45925/PA/19986

**ABSTRACT**

The preparation of metal-based Ni and Mo catalysts supported on H-mordenite via dry impregnation method has been carried out. The aim of this research is to evaluate the characteristics and the arrangement of Ni/Mor and/or Mo/Mor catalyst on the selectivity and yield of bio-aviation fuel in palm oil hydrotreatment. Impregnation was performed using a spray technique with precursor solutions of  $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$  and  $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ . The catalysts were characterized using FTIR, XRD, SEM-EDX, SAA, and  $\text{NH}_3$ -TPD. Catalyst activity tests were carried out through palm oil hydrotreatment using a semi-batch reactor with dual heaters in a one-pot double-decker system. The liquid products from hydrotreatment were analyzed using GC-MS. The catalyst with the highest selectivity and yield of bio-aviation fuel results was analyzed using FTIR.

The research results showed that the Ni/Mor and Mo/Mor catalysts showed surface area characteristics of 318.32 and 337.22  $\text{m}^2/\text{g}$ , respectively; total pore volume of 0.21 and 0.22  $\text{cm}^3/\text{g}$ ; average pore diameters of 2.55 and 2.52 nm; and total acidity of 1.81 and 2.25 mmol/g. Palm oil feed contains the dominant compounds oleic acid (44.38%) and palmitic acid (39.90%). The Ni/Mor single-layer catalyst exhibited the highest selectivity and yield of 88.45% and 28.58%.

Keywords: bio-aviation, hydrotreatment, impregnation, mordenite.