Katalis NiMoO4/SBA-15 Pada Konversi Asam Palmitat Menjadi Senyawa Parafin Untuk Bahan Baku Bioavtur Melalui Reaksi Deoksigenasi Serta Reusabilitas Katalis = NiMo/SBA-15 Bimetallic Oxides as Catalysts In The Conversion Of Palmitic Acid Into Paraffin Compounds For Bioavtur Raw Materials Through Deoxygenation Reactions And Catalyst Reusability Tests

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Abstrak

Bioavtur merupakan alternatif bahan bakar transportasi udara. Indonesia memiliki minyak kelapa sawit terbesar, hasil olahannya dikonversi menjadi senyawa parafin yang merupakan salah satu bahan baku bioavtur. Penelitian ini, NiMoO4/SBA-15 sebagai bahan katalis bimetalik disintesis untuk konversi asam palmitat menjadi parafin melalui reaksi deoksigenasi. SBA-15 disintesis dengan metode sol gel dan variasi NiMoO4/SBA disintesis melalui metode impregnasi basah secara spray beserta katalis monometalik NiO/SBA-15 dan MoO3/SBA-15 dikarakterisasi dengan XRD, FTIR, SAXS, XRF, SEM-EDX Mapping, dan BET. Analisis XRD dan XRF menunjukkan keberhasilan impregnasi NiO, MoO3, dan NiMoO pada SBA-15. Difraktogram sinar-X dan Scanning Electron Microscope (SEM) mengkonfirmasi proses imregnasi basah secara spray dari partikel logam tidak mengubah struktur heksagonal penyangga katalis. Katalis NiMoO4/SBA-15 diuji dalam reaksi deoksigenasi asam palmitat variasri komposisi Ni:Mo, yaitu: 10:0, 2,5:7,5, 5:5, dan 7,5:2,5 waktu 150 menit. Ditinjau dari hasil GC-MS variasi NiMoO4/SBA-15 5:5 memiliki kondisi paling optimum. NiMoO4/SBA-15 5:5 dilakukan pengujian kembali dengan variasi waktu 90 dan 120 menit menunjukan bahwa waktu 120 menit merupakan waktu paling optimum dengan hasil persen yield 86,164 dan persen konversi 61,348. Uji reusabilitas NiMoO4/SBA-15 (5:5) dilakukan dengan menggunakan katalis sebanyak dua siklus. Analisis dengan FT-IR menunjukan bahwa intensitas pada puncak SBA-15 dan NiMoO4 mengalami penurunan intensitas, namun tidak menghasilkan puncak baru.

.....Bioavtur is an alternative fuel for air transportation. Indonesia has the largest palm oil, the processed product is converted into paraffin compounds which are one of the raw materials for bioavtur. In this study, NiMoO4/SBA-15 as a bimetallic catalyst was synthesized for the conversion of palmitic acid to paraffin through a deoxygenation reaction. SBA-15 was synthesized by sol gel method and variations of NiMoO4/SBA were synthesized by wet spray impregnation method with monometallic catalysts NiO/SBA-15 and MoO3/SBA-15 characterized by XRD, FTIR, SAXS, XRF, SEM-EDX Mapping, and BET. XRD and XRF analysis showed the successful impregnation of NiO, MoO3, and NiMoO4 on SBA-15. X-ray diffractogram and Scanning Electron Microscope (SEM) confirmed that the wet spray imregnation process of metal particles did not change the hexagonal structure of the catalyst support. The NiMoO4/SBA-15 catalyst was tested in a palmitic acid deoxygenation reaction with various Ni:Mo compositions, namely: 10:0, 2.5:7.5, 5:5 and 7.5:2.5 for 150 minutes. Judging from the GC-MS results, the NiMoO4/SBA-15 5:5 variation has the most optimum conditions. NiMoO4/SBA-15 5:5 was tested again with variations of 90 and 120 minutes showing that 120 minutes was the most optimal time with a yield percent yield of 86.164 and a conversion percentage of 61.348. NiMoO4/SBA-15 (5:5) reusability test was carried out using two cycles of catalyst. Analysis with FT-IR showed that the intensity of the SBA-15 and NiMoO4 peaks decreased in

intensity, but did not produce new peaks.