

# Catalytic cracking hasil reaksi transesterifikasi minyak nyamplung menjadi biofuel menggunakan katalis $B_2O_3$ / $Al_2O_3$ = Biofuel production from transesterification reaction product of nyamplung oil using catalytic process with $B_2O_3$ $Al_2O_3$ catalyst

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## Abstrak

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Peningkatan kebutuhan bahan bakar dan menipisnya persediaan bahan bakar fosil menyebabkan perlunya dikembangkan bahan bakar minyak yang dapat diperbaharui dengan bahan bakuminyak nabati. Minyak nyamplung merupakan salah satu minyak nabati yang potensial untuk dikembangkan sebagai bahan bakar minyak karena ketersediannya yang cukup banyak, dan minyak nyamplung bukan merupakan minyak pangan sehingga tidak akan mengganggu stabilitas pangan. Penelitian ini bertujuan untuk mempelajari pengaruh perbandingan komposisi katalis  $B_2O_3$  /  $Al_2O_3$  pada proses catalytic cracking minyak nyamplung sehingga memperoleh yield biofuel yang optimum. Penelitian dilakukan dalam tiga tahap yaitu sintesis katalis, karakterisasi katalis dan proses perengkahan katalitik. Hasil katalis yang telah disintesis dan karakterisasi dengan BET Brunauer Emmett-Teller, AAS, Spektrofotometri UV-Vis. Produk hasil proses catalytic cracking dianalisa menggunakan GC-MS Gas Chromatography- Mass Spectrometry. Pembuatan katalis dengan cara impregnasi dan telah berhasil ditunjukkan dengan hasil uji BET. Karakterisasi katalis  $B_2O_3$  /  $Al_2O_3$  mempunyai luas permukaan di atas 100 gr/m<sup>2</sup>. Komposisi katalis  $B_2O_3$  /  $Al_2O_3$  berpengaruh terhadap yield biofuel yang dihasilkan. Secara keseluruhan perbandingan komposisi katalis  $B_2O_3$  terhadap katalis  $Al_2O_3$  paling optimum sebesar 15  $B_2O_3$  menghasilkan gasoline 28,25, kerosene 6,29 dan diesel 6,99.

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The increasing in fuel needs along with decreasing of its availability cause the needs of development in renewable oil fuel by using vegetable oil. Nyamplung oil has a great potential to be developing as oil fuel because of its abundant availability and will not influence the food stability because it is not included as cooking oil. This research is going to study about the ratio of  $B_2O_3$  /  $Al_2O_3$  catalyst composition related to minyak nyamplung catalytic process to result the optimum yield of biofuel. This research is conducted in 3 steps including catalyst synthesis, catalyst characterisation, and catalytic cracking process. The product of synthesis catalyst is characterised by BET, AAS, and UV Vis Spectrofotometer. Mean while the product of catalytic process cracking is analysed by using GC MS. The production of catalyst by using impregnation method has been successful shown by the result of BET.  $B_2O_3$  /  $Al_2O_3$  catalyst characterisation has surface area above of 100 gr m<sup>2</sup>. The  $B_2O_3$  /  $Al_2O_3$  catalyst composition is influencing the biofuel yield product. In conclusion, the most optimum ratio of  $B_2O_3$  /  $Al_2O_3$  catalyst to  $B_2O_3$  /  $Al_2O_3$  catalyst is 15  $B_2O_3$  and is resulting of 28.25 gasoline, 6.29 kerosene and 6.99 diesel.