

PERENKAHAN KATALITIK LIMBAH PLASTIK LDPE MENJADI FRAKSI GASOLIN MENGGUNAKAN KATALIS NIKEL TERIMPREGNASI ZEOLIT ALAM

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INTISARI

Telah dilakukan sintesis katalis Ni/Zeolit Alam untuk hidrorengkah limbah plastik LDPE. Preparasi zeolit dimulai dengan merendam zeolit dengan akuades, lalu direfluks dengan HCl 6M. Selanjutnya zeolit yang sudah teraktivasi diimpregnasi dengan Ni-nitrat menggunakan metode impregnasi basah, sehingga setelah direfluks, dikalsinasi, dan direduksi diperoleh katalis Ni/Zeolit Alam. Tahap berikutnya dilakukan karakterisasi menggunakan XRD, SAA, AAS, FTIR, TEM, dan TG/DTA. Uji aktivitas katalis Ni/Zeolit Alam dilakukan menggunakan reaktor *stainless steel* sistem *semi-batch* untuk hidrorengkah limbah plastik LDPE pada suhu $\leq 200^{\circ}\text{C}$. Produk cair hasil hidrorengkah dianalisis menggunakan GC-MS.

Hasil penelitian menunjukkan bahwa jumlah logam Ni yang teremban pada zeolit alam yaitu sebesar 0,33%. Produk fraksi cair yang diperoleh dalam proses perengkahan limbah plastik LDPE yaitu sebesar 16,5% (b/b) dengan selektivitas fraksi bensin sebesar 11,26 % (b/b).

Kata kunci : Nikel, zeolit alam, impregnasi basah, hidrorengkah, plastik LDPE.

CATALYTIC CRACKING OF LDPE PLASTICS WASTE TO YIELD GASOLINE FRACTION USING NICKEL IMPREGNATED NATURAL ZEOLITE CATALYST

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ABSTRACT

Synthesis of Ni/Natural Zeolite catalyst for hydrocracking of LDPE plastic waste fraction has been investigated. Zeolite preparation begins by immersing the zeolite to aquadest, then refluxed with 6M HCl. Furthermore, the activated zeolite was impregnated with Ni[NO₃]₂ using wet impregnation method, afterward it was refluxed, calcined, and reduced the Ni/ Natural Zeolite catalyst was obtained. The next steps was characterization using XRD, SAA, AAS, FTIR, TEM, dan TG/DTA. The Ni/Natural Zeolite catalyst activity test was carried out using a semi-batch stainless steel reactor for the hydrocracking waste of LDPE plastic at a temperature of $\leq 200^{\circ}\text{C}$. Hydrocracked liquid product was analyzed using GC-MS.

The results showed that the amount of Ni metal that was impregnated on natural zeolite was 0.33%. The liquid fraction product obtained from LDPE plastic cracking process was 16.5% (w/w) with the selectivity of the gasoline fraction of 11.26% (w/w).

Keywords: Nickel, natural zeolite, wet impregnation, hydrocracking, LDPE plastic.