



ZEOLIT TERMODIFIKASI NATRIUM BIKARBONAT UNTUK PENINGKATAN MUTU MINYAK NILAM

Dyah Yekti Indrajati
16/403609/PPA/05126

INTISARI

Pemurnian minyak nilam menggunakan zeolit termodifikasi natrium bikarbonat telah dilakukan. Tujuan penelitian ini adalah untuk membuat adsorben menggunakan zeolit yang dimodifikasi NaHCO_3 untuk meningkatkan mutu minyak nilam agar sesuai dengan SNI 06-2385-2006. Zeolit yang digunakan adalah zeolit alam. Rasio NaHCO_3 :zeolit (%b/b) yang digunakan adalah 0:100, 20:80, 40:60, 60:40, 80:20, dan 100:0. Modifikasi zeolit dengan NaHCO_3 dilakukan dengan menggunakan teknik *dry mixing* dilanjutkan kalsinasi pada variasi temperatur 300 °C, 400 °C dan 500 °C selama 2 jam. Material adsorben dengan rasio NaHCO_3 :zeolit 40:60 (%b/b) yang dikalsinasi 300 °C memiliki kemampuan adsorpsi pengotor organik dan asam bebas dalam minyak nilam yang terbaik dan disingkat NAZE (natrium-zeolit) 40/60 T300. Material terbaik selanjutnya dikarakterisasi dengan XRD, FTIR, SEM, TEM, SAA, dan XRF dan diuji kemampuannya untuk pemurnian minyak nilam.

Hasil XRD dan FTIR terhadap material NAZE 40/60 T300 menunjukkan munculnya kombinasi puncak yang karakteristik dengan zeolit dan Na_2CO_3 . Na_2CO_3 merupakan senyawa dekomposisi dari NaHCO_3 yang dikalsinasi 300 °C. Hasil karakterisasi terhadap luas permukaan adsorben menunjukkan adsorben memiliki luas permukaan sebesar $28,256 \text{ m}^2 \text{ g}^{-1}$, dan rata-rata ukuran pori sebesar 8,686 nm, sedangkan kurva distribusi pori menunjukkan adanya pori-pori baru yang terbentuk pada zeolit disebabkan adanya gas CO_2 akibat pemanasan NaHCO_3 yang menginduksi pori zeolit. Pemurnian minyak nilam menggunakan NAZE 40/60 T300 menghasilkan minyak yang memenuhi SNI 06-2385-2006 dengan kadar *patchouli alcohol* sebesar 44,11%, kadar besi $0,291 \text{ mg L}^{-1}$, dan bilangan asam sebesar $0,66 \text{ mg KOH g}^{-1}$ minyak.

Kata kunci : zeolit, natrium bikarbonat, minyak nilam



SODIUM BICARBONATE MODIFIED ZEOLITE TO ENHANCE THE QUALITY OF PATCHOULI OIL

Dyah Yekti Indrajati
16/403609/PPA/05126

ABSTRACT

The purification of patchouli oil used sodium bicarbonate modified zeolite had been carried out. The aim of this study is to make a adsorben using zeolite modified by NaHCO_3 to improve the quality of patchouli oil. Zeolite had been used was natural zeolite. The ratio of NaHCO_3 :zeolite that had been used for the purification was 0:100, 20:80, 40:60, 60:40, 80:20, and 100:0. Modification of zeolite with NaHCO_3 was carried out using dry mixing technique followed by calcination at temperature variations of 300 °C, 400 °C and 500 °C for 2 hours. The adsorbent material with the ratio of NaHCO_3 : zeolite 40:60 (%w/w) was calcined at 300 °C has the best adsorption ability of organic impurities and free acids in patchouli oil and named as NAZE (sodium-zeolite) 40/60 T300. The best material is then characterized by DTA/TGA, XRD, FTIR, SEM, TEM, and XRF and tested for purification of patchouli oil.

The result of XRD and FTIR on the NAZE 40/60 T300 material showed the presence of combination of peaks that was characteristic of zeolite and Na_2CO_3 . Na_2CO_3 is the product of NaHCO_3 decomposition due to calcination at 300 °C. The characterization results on the surface area of the adsorbent showed that the adsorbent had a surface area of $28.256 \text{ m}^2 \text{ g}^{-1}$, and the average pore size was 8,686 nm, while the pore distribution curve showed the presence of new pores formed on zeolites due to CO_2 gas due to heating of NaHCO_3 induces zeolite pores. Purification of patchouli oil using NAZE 40/60 T300 has produced oil that meets SNI 06-2385-2006 with patchouli alcohol content of 44.11%, iron content of 0.291 mg L^{-1} , and the acid number is $0.66 \text{ mg KOH g}^{-1}$ oil.

Keyword : Zeolite, Sodium bicarbonate, Patchouli oil