

KOMPOSIT KABON AKTIF/MAGNETIT UNTUK MENURUNKAN KADAR Fe DAN BILANGAN ASAM PADA MINYAK NILAM

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INTISARI

Telah dipelajari interaksi komposit karbon aktif/magnetit dengan minyak nilam untuk menurunkan kadar Fe dan bilangan asam. Tujuan dari penelitian ini yaitu untuk menentukan komposisi karbon aktif dan magnetit serta kondisi optimum dalam proses adsorpsi. Pertama, karbon aktif disintesis dari limbah distilasi minyak nilam dengan aktivasi kimia menggunakan H_3PO_4 60% dan aktivasi fisika dengan pemanasan pada temperatur 400 °C. Kedua, pembuatan komposit karbon aktif/magnetit dengan metode sonokimia kopresitasi dari Fe^{3+} dan Fe^{2+} dengan perbandingan mol 2:1 diinteraksikan dengan karbon aktif variasi masa 0,25, 0,5, dan 1 g kemudian ditambahkan NH_4OH 25% sampai pH 11. Komposit karbon aktif/magnetit yang diperoleh secara berturut-turut diberi simbol 1, 5, dan 10, kemudian dikarakterisasi menggunakan *Fourier Transform Infrared (FTIR) spectroscopy*, *X-Ray Diffraction (XRD)* *Scanning Electron Microscopy-Energy Dispersive X-ray (SEM-EDX)*, dan *Vibrating Sample Magnetometer (VSM)*. Ketiga, penentuan kondisi optimum pada proses adsorpsi minyak nilam dengan komposit karbon aktif/magnetit meliputi waktu pendiaman dan waktu adsorpsi optimum.

Hasil karakterisasi FTIR dan XRD menunjukkan komposit karbon aktif/magnetit telah berhasil disintesis karena terdapat puncak-puncak karakteristik. Data VSM menunjukkan magnetisasi saturasi (Ms) magnetit dan karbon aktif/magnetit 5 masing-masing sebesar 63,16 dan 43,12 emu/g. Hasil studi adsorpsi menunjukkan karbon aktif/magnetit 5 dapat menyerap logam Fe dalam minyak nilam secara optimum pada waktu kontak 360 menit dan pendiaman 24 jam. Berdasarkan dari hasil uji, proses adsorpsi mampu menurunkan kadar Fe dan bilangan asam sebesar 41 dan 86%.

Kata kunci: adsorpsi, karbon aktif, magnetit, minyak nilam

ACTIVATED CARBON/MAGNETITE COMPOSITE TO REDUCE Fe LEVEL AND ACID NUMBER OF PATCHOULI OIL

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ABSTRACT

Preparation of composite from activated carbon and magnetite for reduce Fe level and acid number of patchouli oil has been studied in this research. The purpose of this research are to determine the composition of activated carbon and magnetite and to determine the optimum condition of adsorption. The first step was synthesized the activated carbon from the waste material of steam distillation had been using H_3PO_4 60% as a chemical activation and it heated at temperature 400 °C. Second, the activated carbon with various weight 0.25, 0.5, and 1 g was modified with magnetite by sonochemical co-precipitation method had been using Fe^{3+} and Fe^{2+} with mol ratio 2:1. Ammonia 25% added until the pH value has reached at least 11. This materials was characterized by the Fourier Transform Infrared (FTIR) spectroscopy, the X-Ray Diffraction (XRD), the Scanning Electron Microscopy-Energy Dispersive X-ray (SEM-EDX), and the Vibrating Sample Magnetometer (VSM). Third, the determination of optimum conditions in patchouli oil adsorption process with composite of activated carbon/magnetite includes the idle time and adsorption time.

The results showed that composite of activated carbon/magnetite 5 had been successfully synthesized as shown to FTIR spectra and XRD diffractogram. The data of VSM showed saturation magnetization (Ms) of magnetite and composite of activated carbon/magnetite 5 were 63.16 and 43.12 emu/g. The result of adsorption study shows that Fe could be adsorbed by the composite of activated carbon/magnetite 5, with the maximum adsorption at contact time 360 minutes and the optimal idle time was 24 hours. According to the results, Fe concentration and acid number of patchouli oil are decreased by 41 and 86%.

Keywords: adsorption, activated carbon, magnetite, patchouli oil