ABSTRAK

Deby Febriyanti, NIM. 4223210017 (2022). Analisis Adsorpsi Logam Timbal (Pb) Menggunakan Adsorben Dari Kulit Kacang Tanah Yang Dikombinasikan dengan Kitosan Dari Kulit Udang

Penelitian ini dilaksanakan untuk mengkaji komposisi adsorben berbasis karbon aktif dari limbah kulit kacang tanah yang dikombinasikan dengan kitosan dari kulit udang. Karakterisasi adsorben dilakukan menggunakan *Fourier Transform Infrared* (FTIR), *Brunauer-Emmett-Teller* (BET), dan *Atomic Absorption Spectroscopy* (AAS). Karbonisasi dilakukan pada suhu 450 °C, disertai dengan aktivasi kimia menggunakan larutan HCl 4 N. Kitosan diperoleh melalui 3 tahapan, diantaranya demineralisasi, deproteinisasi, dan deasetilasi yang kemudian dikombinasikan dengan karbon aktif tersebut. Uji kemampuan adsorpsi pada kation logam timbal (Pb) dianalisis menggunakan AAS dengan variasi massa adsorben dan durasi kontak. Hasil analisis FTIR adsorben dari karbon aktif kulit kacang tanah-kitosan kulit udang mengalami tumpang tindih pada gugus karbon aktif dengan gugus kitosan di bilangan gelombang 3431,4 cm^{-1}. Munculnya gugus C=C aromatik pada serapan 1600 cm^{-1}. Selain itu, terdapat gugus C-H alifatik pada serapan 2890 cm^{-1}. Karakterisasi BET karbon aktif kulit kacang tanah-kitosan kulit udang mengalami penurunan luas permukaan dari 109,375 m^2/g menjadi 7,495 m^2/g. Kondisi optimum tercapai pada massa adsorben 4 g dan waktu kontak 90 menit. Efisiensi penyerapan karbon aktif kulit kacang tanah-kitosan mencapai 95%, lebih tinggi dibandingkan karbon aktif tanpa kitosan yang hanya sebesar 93%.

Kata kunci: Adsorpsi, Karbon Aktif, Kitosan, Kulit Kacang Tanah, Logam Pb

THE Character Building UNIVERSITY

ABSTRACT

Deby Febriyanti, NIM. 4223210017 (2022). Analysis of Lead (Pb) Metal Adsorption Using Adsorbent from Peanut Shells Combined with Chitosan from Shrimp Shells

This study was conducted to study the composition of activated carbon-based adsorbents from peanut shell waste combined with chitosan from shrimp shells. Adsorbent characterization was carried out using *Fourier Transform Infrared* (FTIR), *Brunauer-Emmett-Teller* (BET), and *Atomic Absorption Spectroscopy* (AAS). Carbonization was carried out at a temperature of 450°C, accompanied by chemical activation using 4 N HCl solution. Chitosan was obtained through 3 stages, including demineralization, deproteinization, and deacetylation which were then combined with the activated carbon. The adsorption capacity test on lead (Pb) metal cations was analyzed using AAS with variations in adsorbent mass and contact duration. The results of the FTIR analysis of the adsorbent from peanut shell activated carbon-shrimp shell chitosan experienced overlap in the activated carbon group with the chitosan group at a wave number of 3431.4 cm^{-1}. The appearance of the aromatic C=C group at 1600 cm^{-1} absorption. In addition, there is an aliphatic C-H group at 2890 cm^{-1} absorption. BET characterization of peanut shell-chitosan activated carbon shrimp shells experienced a decrease in surface area from 109.375 m^2/g to 7.495 m^2/g. The optimum condition was achieved at an adsorbent mass of 4 g and a contact time of 90 minutes. The absorption efficiency of peanut shell-chitosan activated carbon reached 95%, higher than activated carbon without chitosan which was only 93%.

Keywords: Adsorption, Activated Carbon, Chitosan, Peanut Shell, Pb Metal

THE Character Building UNIVERSITY