



SINTESIS MANIK ASAM HUMAT/KARBON AKTIF/ALGINAT SEBAGAI ADSORBEN ION Pb(II)

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ABSTRAK

Manik asam humat/karbon aktif/alginate telah berhasil disintesis. Manik digunakan untuk mengetahui kemampuan adsorpsi dan desorpsi terhadap ion Pb(II), serta mempelajari kinetika dan model isoterm adsorpsinya.

Penelitian ini diawali dengan sintesis manik asam humat/karbon aktif/alginate, kemudian dilakukan karakterisasi menggunakan *Fourier Transform Infrared* (FTIR), *Scanning Electron Microscopy* (SEM) dan *Surface Area Analyzer* (SAA), serta uji kestabilan manik pada medium asam basa dan uji penyerapan air. Manik kemudian digunakan untuk studi adsorpsi ion Pb(II) dengan pengaruh variasi komposisi, pH, waktu kontak dan konsentrasi awal larutan. Hasil penelitian yang didapatkan pada pengaruh waktu kontak dan konsentrasi awal digunakan untuk mempelajari kinetika dan isoterm adsorpsi.

Hasil karakterisasi menunjukkan bahwa manik memiliki gugus aktif antara lain -COOH dan -OH , dengan struktur mesopori, serta stabil pada pH 2-6. Studi adsorpsi menunjukkan manik mencapai kapasitas adsorpsi optimum pada perbandingan komposisi 1:1:1 (b/b/b), pada pH 5, waktu kontak 90 menit dan konsentrasi awal larutan 350 mg L^{-1} . Studi desorpsi menunjukkan larutan Na_2EDTA 0,1 M mendesorpsi ion Pb(II) dengan persentase paling tinggi yaitu 98,41%. Adsorpsi ion Pb(II) oleh manik mengikuti model kinetika orde kedua semu dan pola isoterm mengikuti model isoterm Freundlich.

Kata kunci: adsorpsi, asam humat, karbon aktif, alginate, ion Pb(II).



SYNTHESIS OF HUMIC ACID/ACTIVATED CARBON/ALGINATE BEADS AS ADSORBEN OF Pb(II) ION

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ABSTRACT

Beads of humic acid/activated carbon/alginate have been conducted. The synthesized manik were used for the adsorption and desorption of Pb(II) ions, adsorption kinetics and isotherm of adsorption model.

This research was begun with the preparation of humic acid/activated carbon/alginate beads, the characterization of the beads by using Fourier Transform Infrared (FTIR), Scanning Electron Microscopy (SEM), and Surface Area Analyzer (SAA), stability test in acid-base medium, and swelling test. The beads was further used to study of adsorption Pb(II) ions on the variation of composition mass, pH, time contact, and concentration of Pb(II) ions. The optimum result of time contact variation obtained was used study the adsorption kinetics and the optimum result of variation concentration of Pb (II) ions was used to study the isotherm model.

The results of the characterization showed that beads have functional groups including -COOH and -OH with mesopore structure and the beads was stable at the pH 2-8. The study of adsorption was obtained for optimum condition of Pb(II) ions at the ration composition 1:1:1 (b/b/b), pH 5, contact time 90 min and concentration 350 mg L^{-1} . The study desorption showed that 0,1 M Na_2EDTA solution could desorped the Pb(II) ion with the highest presented of 98.41%. The Pb(II) ions adsorption kinetics model could be explained by a pseudo second order kinetics model and the adsorption isotherm was followed by Freundlich isotherm model.

Keywords: adsorption, humic acid, activated carbon, alginate, Pb(II) ions.