

ADSORPSI ION Cd(II) OLEH ASAM HUMAT YANG DIIMOBILISASI PADA HIDROKSIAPATIT

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INTISARI

Adsorpsi Cd(II) pada adsorben asam humat yang terimobilisasi pada hidroksiapatit telah berhasil dilakukan. Tujuan dari penelitian ini yaitu untuk mempelajari pengaruh pH, isoterm Adsorpsi dan kinetika Adsorpsi logam Cd(II) pada hidroksiapatit terimobilisasi asam humat.

Asam humat diisolasi dari tanah gambut dan HAP disintesis dari cangkang kulit telur bebek yang telah dihaluskan. Asam humat diimobilisasikan dengan HAP, diatur pH hingga 11 dan dipanaskan pada suhu 80 °C. Adsorben diinteraksikan dengan logam Cd(II) dengan variasi pH, konsentrasi Cd(II) dan waktu kontak. Model isotermal dan kinetika adsorpsi kemudian ditentukan dari uji dengan variasi konsentrasi dan waktu kontak. Adsorben dikarakterisasi menggunakan FTIR, AAS, SEM, dan XRD.

Hasil penelitian menunjukkan bahwa adsorpsi Cd(II) oleh HA-HAP mencapai optimum pada pH 6, model isoterm adsorpsi yang sesuai yaitu model Langmuir dengan nilai K_L sebesar 22.295,27 L/mol, q_{maks} 169,12 mg/g, dan $\Delta G = -24,973$ kJ. Sementara itu model kinetika adsorpsi mengikuti model Ho dengan nilai konstanta laju adsorpsi $1,63 \times 10^{-3} \text{ g mg}^{-1} \text{ menit}^{-1}$.

Kata kunci: Adsorpsi, Asam Humat, Cd(II), Hidroksiapatit, Imobilisasi

***ADSORPTION OF Cd(II) ION BY HUMIC ACID IMMOBILIZED ON
HYDROXYAPATITE***

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ABSTRACT

Adsorption of Cd(II) in the hydroxyapatite immobilized by humic acid has been done. The purpose of this research were studying the effect of pH, the adsorption isotherm and the kinetics of adsorption Cd(II) on the humic acid immobilized by hydroxyapatite.

Humic acid was isolated from peat soils and HAP was synthesized from mashed duck eggshell. Humic acid was immobilized with HAP, then the pH of mixture was adjusted to 11 and kept in the oven at 80 °C and henceforth can be said as an adsorbent. The adsorbent was further interacted with Cd(II) metal at various pH, concentrations and contact time. The isothermal model and the kinetics of adsorption were defined from the various concentrations and contact time. Adsorbents were characterized using FTIR, AAS, SEM, and XRD.

The results showed that adsorption of Cd(II) by HA-HAP were reached the optimum pH of 6 the adsorption isotherm was fit with Langmuir isotherm models with K_L value of 22,295.27 L mol⁻¹, q_{max} of 169.12 mg g⁻¹, and ΔG of -24.97 kJ. Meanwhile the adsorption kinetics model follows the Ho model with k value of 1.63 x 10⁻³ g mg⁻¹ minutes⁻¹.

Keywords: Adsorption, Humic Acid, Cd(II), Hydroxyapatite, Immobilized