

**ADSORPSI ION LOGAM Pb(II) DAN Cd(II)
PADA ADSORBEN ABU LAYANG BATUBARA (COAL FLY ASH)
TERIMOBILISASI DITIZON**

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INTISARI

Adsorpsi ion logam Pb(II) dan Cd(II) pada adsorben abu layang batubara terimobilisasi ditizon (CFAD) telah dilakukan dengan sistem *batch*. Adsorben yang telah disintesis dikarakterisasi menggunakan FTIR, XRD, TG-DTA, adsorpsi-desorpsi N₂ (BET) dan SEM. Beberapa parameter yang berpengaruh terhadap adsorpsi ion logam Pb(II) dan Cd(II) diantaranya: pH larutan, massa adsorben, waktu interaksi dan konsentrasi awal ion logam telah dipelajari.

Kondisi optimum pada adsorpsi ion logam Pb(II) adalah pada pH larutan 5, massa adsorben 0,1 g, waktu interaksi 60 menit dan konsentrasi awal ion logam Pb(II) 60 mg L⁻¹. Adsorpsi ion logam Cd(II) mencapai kondisi optimum pada pH larutan 7, massa adsorben 0,1 g, waktu interaksi 75 menit dan konsentrasi awal ion logam Cd(II) 50 mg L⁻¹. Kinetika adsorpsi dari kedua ion logam mengikuti model orde kedua semu dan isotherm adsorpsi mengikuti model isotherm Langmuir. Hasil studi kinetika dan isotherm adsorpsi menunjukkan bahwa kapasitas dan afinitas dari adsorben abu layang batubara terimobilisasi ditizon dalam mengadsorpsi ion logam Pb(II) dan Cd(II) lebih tinggi dibandingkan dengan adsorben tanpa imobilisasi ditizon.

Kata kunci: adsorben, abu layang batubara, imobilisasi, ditizon

ADSORPTION OF Pb(II) AND Cd(II) METAL IONS ON DITHIZONE-IMMOBILIZED COAL FLY ASH

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ABSTRACT

Adsorption of Pb(II) and Cd(II) ions onto selective adsorbent of dithizone-immobilized coal fly ash (DCFA) from Holcim, Cilacap, Indonesia has been investigated in batch experiments. Coal fly ash (CFA) adsorbent that has been modified by immobilization of dithizone were characterized by FTIR, XRD, TG-DTA, adsorption-desorption N₂ (BET) and SEM.

Several parameters influencing the adsorption of Pb(II) and Cd(II) ions such as effect of pH, adsorbent dosage, contact time, and initial concentration of metal ions on the efficiency of the adsorption were studied. The optimum condition of Pb(II) adsorption was found at pH 5, adsorbent dosage 0.1 g, contact time 60 min and initial Pb(II) ions concentration of 60 mg L⁻¹. Meanwhile, for Cd(II) adsorption it was found at pH 7, adsorbent dosage 0.1 g, contact time 75 min and initial Cd(II) concentration of 50 mg L⁻¹. The adsorption kinetics of both metal ions were found to follow a pseudo-second-order kinetic model. The adsorption isotherm data were well fitted to the Langmuir model for both adsorption of Pb(II) and Cd(II) ions on DCFA. Kinetics and adsorption isotherm studies suggest that the capacity and affinity of the DCFA in adsorbing hazardous metal ions of Pb(II) and Cd(II) ions is significantly improved compared to those of non-immobilized activated coal fly ash (ACFA).

Keywords: adsorbent, coal fly ash, immobilization, dithizone