



ELECTRONIC THESIS AND DISSERTATION UNSYIAH

TITLE

PEMBUATAN KOMPOSIT KITOSAN MAGNETIK TERSULFONASI BERIKATAN SILANG GLUTARALDEHID SEBAGAI ADSORBEN MERKURI

ABSTRACT

ABSTRAK

Pembuatan komposit kitosan magnetik tersulfonasi berikatan silang glutaraldehid (K-BM-S-GLA) telah berhasil dilakukan dan diaplikasikan sebagai adsorben merkuri. Pembuatan komposit K-BM-S-GLA dilakukan dengan variasi komposisi kitosan tersulfonasi, pasir besi dan glutaraldehid (GLA). Pasir besi diperoleh dari pantai Syiah Kuala, Banda Aceh. Komposit K-BM-S-GLA dikarakterisasi menggunakan Fourier Transform Infrared (FT-IR), X-Ray Diffraction (XRD) dan Scanning Electron Microscope (SEM). Komposisi terbaik dari komposit K-BM-S-GLA yaitu 0,65 g kitosan tersulfonasi, 0,5 g pasir besi dan GLA 0,17 M. Hasil uji adsorpsi menunjukkan bahwa kapasitas adsorpsi tertinggi diperoleh pada waktu kontak 60 menit dan pH 3. Adsorpsi merkuri menggunakan komposit K-BM-S-GLA mengikuti model isoterm adsorpsi Langmuir dan Freundlich. Kapasitas adsorpsi maksimum berdasarkan isoterm adsorpsi Langmuir adalah 93,46 mg/g. Aplikasi adsorben pada limbah pertambangan emas menunjukkan persen penghilangan merkuri mencapai 98,24%.

Kata kunci: glutaraldehid, kitosan, merkuri, pasir besi, sulfonasi

ABSTRACT

Preparation of glutaraldehyde crosslinked sulfonated magnetic chitosan composite (K-BM-S-GLA) has been successfully conducted and applied as an adsorbent of mercury. K-BM-S-GLA composites were prepared with various composition of sulfonated chitosan, iron sand, and glutaraldehyde (GLA). Iron sand was obtained from Syiah Kuala beach, Banda Aceh. K-BM-S-GLA composites were characterized using Fourier Transform Infrared (FT-IR), X-Ray Diffraction (XRD) and Scanning Electron Microscope (SEM). The best composition of K-BM-S-GLA composites was 0.65 g sulfonated chitosan, 0.5 g iron sand and GLA 0.17 M. Based on adsorption study, the highest adsorption capacity was obtained at the contact time of 60 minutes and pH 3. Mercury adsorption by the K-BM-S-GLA composites fitted to both Langmuir and Freundlich adsorption isotherm models. The maximum adsorption capacity based on Langmuir's adsorption isotherm was 93.46 mg/g. The application of adsorbent in the gold mining waste showed the percentage of mercury removal was reached 98.24%.

Keywords: chitosan, glutaraldehyde, iron sand, mercury, sulfonation