SINTESIS *BEADS* KITOSAN-ASAM HUMAT SEBAGAI ADSORBEN Pb(II)

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INTISARI

Telah dilakukan sintesis *beads* kitosan-asam humat dan digunakan untuk adsorpsi-desorpsi ion Pb(II). *Beads* yang terbentuk dikarakterisasi menggunakan FTIR, SEM, dan uji kestabilan *beads* terhadap variasi pH. Uji kemampuan *beads* terhadap logam Pb(II) dilakukan pada berbagai variasi perbandingan komposisi kitosan dan asam humat, pH, waktu kontak, dan konsentrasi awal logam Pb(II). Selanjutnya dilakukan studi kinetika adsorpsi, isoterm adsorpsi, dan uji desorpsi.

Hasil karakterisasi dengan FTIR menunjukkan adanya interaksi antara kitosan dan asam humat, karakterisasi dengan SEM menunjukkan adanya perubahan permukaan *beads* sebelum dan sesudah adsorpsi, dan kestabilan *beads* pada pH 4-12. Pada proses adsorpsi, *beads* dengan komposisi kitosan:asam humat 1:1 menunjukkan kemampuan adsorpsi tertinggi. Kondisi optimum adsorpsi diperoleh pada pH 4 di menit ke 75. Kinetika adsorpsi mengikuti pesudo orde dua dengan nilai k= 0,039 g mg^{-1} $menit^{-1}$ dan mengikuti isoterm Freundlich dengan kapasitas adsorpsi 30,8 mg g^{-1}. Kajian desorpsi menunjukkan bahwa mekanisme adsorpsi Pb(II) diduga melalui mekanisme pembentukan kompleks dan pertukaran ion.

Kata kunci: *beads*, kitosan, asam humat, adsorpsi, logam Pb(II)

SYNTHESIS OF CHITOSAN-HUMIC ACID BEADS AS THE ADSORBENT OF Pb(II)

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ABSTRACT

A research on the preparation of chitosan-humic acid beads and the study of the adsorption and desorption of Pb(II) ions has been conducted. The beads were characterized by FTIR, SEM, and the stability of beads in a variation of pH were analyzed. Adsorption capabilities were studied by varying the chitosan and humic acid composition ratios, pH, contact times, the concentration of Pb(II) ions, and also adsorption kinetics, adsorption isotherm, and desorption activities.

The interaction between chitosan and humic acid was proved by the FTIR spectra, the surface morphology of beads was changed before and after adsorption as shown in SEM results, and stability of beads at pH 4-12. The Pb(II) ions uptake of the beads with 1:1 ratio of chitosan and humic acid was the highest. The optimum of Pb(II) ions adsorption occurs at pH 4 with a time of 75 minutes. Adsorption kinetics followed the pseudo second order with k value 0.039 g mg^{-1} min^{-1} and Freundlich isotherm model with adsorption capacity value of 30.8 mg g^{-1}. Desorption study showed that Pb(II) adsorption mechanism was through formation of complex and ions exchange mechanism.

Keyword: beads, humic acid, chitosan, adsorption, lead