



## **ADSORPSI ION Pb(II) PADA FILM KITOSAN-ASAM HUMAT**

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### **INTISARI**

Penelitian tentang “Adsorpsi Ion Pb(II) pada Film Kitosan-Asam Humat” telah dilakukan. Film kitosan-asam humat (KAH) disintesis secara langsung dalam pelarut asam-basa disertai pengadukan sampai homogen, kemudian dikeringkan pada suhu 70 °C. Perbandingan berat kitosan:asam humat yang digunakan adalah 50:50. Film dikarakterisasi menggunakan FTIR untuk identifikasi gugus fungsi dan SEM untuk analisis citra film sebelum serta sesudah dilakukan adsorpsi. Kajian adsorpsi yang dipelajari meliputi pengaruh perbandingan berat membran, pH larutan, waktu kontak, konsentrasi awal adsorbat, kinetika dan isoterm adsorpsi. Kajian desorpsi dipelajari untuk mengetahui tipe interaksi yang terjadi antara logam dengan situs aktif film dalam proses adsorpsi.

Spektra FTIR film KAH menunjukkan beberapa puncak serapan yang teridentifikasi memiliki kemiripan dengan puncak serapan pada material penyusunnya. Citra SEM film KAH sesudah dilakukan adsorpsi ion Pb(II) menunjukkan perubahan yang signifikan terhadap permukaan membran. Adsorpsi ion Pb(II) pada film KAH optimum pada pH 5, waktu kontak 90 menit dan konsentrasi 100 mg L<sup>-1</sup>. Model kinetika adsorpsi ion Pb(II) pada film KAH dapat dijelaskan melalui kinetika pseudo orde dua McKay & Ho dengan nilai konstanta laju adsorpsi (*k*) sebesar 2,0×10<sup>-2</sup> mg g<sup>-1</sup> menit<sup>-1</sup>. Kajian isoterm adsorpsi mengikuti model isoterm Freundlich dengan nilai kapasitas adsorpsi eksperimen sebesar 21,59 mg g<sup>-1</sup> adsorben dan konstanta Freundlich (*K<sub>f</sub>*) sebesar 0,052. Kajian desorpsi menunjukkan model interaksi berlangsung melalui mekanisme pembentukan khelat.

Kata kunci: membran, kitosan, asam humat, adsorpsi, logam, Pb(II).

## **ADSORPTION OF Pb(II) ION ON CHITOSAN-HUMIC ACID FILM**

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### **ABSTRACT**

Study on adsorption of Pb(II) ion by chitosan-humic acid film has been conducted. The chitosan-humic acid (KAH) film was synthesized directly in acid-base solutions with stirring until homogeneous, and was dried at 70 °C. Mass ratio of chitosan:humic acid is 50:50 was used. Functional groups of the film were identified using FTIR and SEM was used to analyze the surface image of the film before and after adsorption. In the adsorption study, the effect of film composition, pH, contact time, initial ion concentration, adsorption kinetics and isotherm were examined. The desorption was studied to determine the type of interaction between the metals and the active site of the film.

The FTIR results showed peak similarities between film and starting materials. The SEM images after adsorption of Pb(II) showed that the surface of the film was significantly changed. Adsorption of Pb(II) onto KAH film was optimum at pH 5, contact time of 90 minutes and the initial concentration of 100 mg L<sup>-1</sup>. Adsorption kinetics of Pb(II) onto KAH film was successfully fit with pseudo-second order model by McKay & Ho with adsorption rate constant (*k*) of 2.0×10<sup>-2</sup> mg g<sup>-1</sup> minutes<sup>-1</sup>. Pb(II) adsorption followed Freundlich's isotherm model with adsorption capacity of 21.59 mg g<sup>-1</sup> and adsorption constant (*K<sub>f</sub>*) of 0.052. Desorption study of Pb(II) showed that adsorption occurs through chemical interaction.

Keywords: membrane, chitosan, humic acid, adsorption, metal, Pb(II).