

**STUDI ADSORPSI LOGAM Pb(II) PADA MEMBRAN MAKROPORI KITOSAN-
KARAGINAN TERTAUT-SILANG GLUTARALDEHIDA**

Sofan Hadi

11/316948/PA/14066

INTISARI

Telah dilakukan penelitian tentang adsorpsi logam Pb(II) pada membran makropori kitosan-karaginan tertaut silang glutaraldehida. Tujuan penelitian ini untuk mengetahui kemampuan adsorpsi membran kitosan-karaginan dengan silika sebagai porogen tertaut silang glutaraldehida.

Penelitian ini diawali dengan pembuatan membran makropori kitosan-karaginan. Membran yang terbentuk di karakterisasi dengan FTIR dan SEM. Kajian adsorpsi membran meliputi variasi komposisi perbandingan kitosan:karaginan, variasi jumlah silika pada membran, variasi waktu kontak, optimasi pH larutan, dan variasi konsentrasi awal, sedangkan kajian desorpsi dilakukan dengan metode sekuensial.

Hasil penelitian menunjukkan membran makropori menghasilkan persentase adsorpsi sebesar 32,18 mg/g sedangkan membran tanpa pori sebesar 23,38 mg/g. adsorpsi optimum terjadi pada pH 4, waktu kontak 60 menit, dan konsentrasi 700 ppm pada setiap 40 mg dalam 20 ml larutan Pb(II). Adsorpsi mengikuti kinetika orde pseudo-2 dengan konstanta laju reaksi sebesar $1,8 \times 10^{-2} \text{ g mg}^{-1} \text{ min}^{-1}$. Kajian isotherm adsorpsi mengikuti model isotherm Freundlich dengan kapasitas adsorpsi eksperimen sebesar 138.5 mg/g. berdasarkan hasil desorpsi, interaksi antara ion logam Pb(II) dengan membran makropori kitosan-karaginan didominasi oleh interaksi pemerangkapan, interaksi pembentukan ikatan hidrogen, dan interaksi pembentukan kompleks.

Kata kunci: kitosan, karaginan, PEC, makropori, SiO₂, Pb(II)

STUDY ADSORPTION OF Pb(II) BY MACROPOROUS MEMBRANE CHITOSAN- CARRAGEENAN CROSSLINKED GLUTARALDEHYDE

Sofan Hadi

11/316948/PA/14066

ABSTRACT

Study adsorption of Pb(II) by macroporous chitosan-carrageenan glutaraldehyde crosslinked membrane was conducted. This research was aimed to investigate the adsorption capacity of chitosan-carrageenan with silica as porous crosslinked glutaraldehyde.

Chitosan-carrageenan macroporous membrane was first prepared and characterized by Fourier Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscope (SEM). The composition of chitosan-carrageenan, amount of silica in the membrane, contact time, pH and initial concentration were varied to study the membrane adsorption. The desorption was investigated by sequential method.

The result showed the adsorption percentage by macroporous membrane was 32.18 mg/g whereas by the non-pore membrane was 23.38 mg/g. The optimum pH was 4 with 60 min contact time and the initial concentration was 700 ppm for every 40 mg of membrane macroporous in 20 mL Pb (II) solution. The reaction was following pseudo-second order reaction and the rate constant was $1.8 \times 10^{-2} \text{ g mg}^{-1} \text{ min}^{-1}$. The adsorption isotherm was agreed with Freundlich isotherm and the adsorption capacity of experiment was 138.5 mg/g. The desorption result shows that the interaction of Pb(II) and chitosan carrageenan macropores membrane is dominated by trapped interaction, hydrogen bonding formation and complex formation.

Key words: chitosan, carrageenan, polyelectrolyte complex, macroporous, SiO₂, lead(II)