

## INTISARI

### **MODIFIKASI BAHAN MAGNETIK PASIR BESI TERLAPIS KITOSAN DENGAN GLISIDILTRIMETILAMMONIUM KLORIDA UNTUK ADSORPSI Cr(VI)**

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Pada penelitian ini telah dilakukan pelapisan kitosan termodifikasi ammonium kuarterner pada bahan magnetik pasir besi dan aplikasinya untuk adsorpsi anion Cr(VI). Penelitian ini diawali dengan isolasi material magnetik (MM) dari pasir besi, sintesis material magnetik-kitosan (MM-Kit), dan material magnetik-kitosan termodifikasi glisidiltrimetilammonium klorida (MM-Kit-GTMAC) dengan variasi massa. Produk dikarakterisasi dengan FT-IR, XRD, SEM-EDX, dan VSM. Adsorpsi dikaji dalam sistem *batch* dengan variasi pH, waktu kontak, dan konsentrasi awal anion Cr(VI). Anion Cr(VI) yang tidak teradsorpsi dianalisis dengan AAS.

Hasil penelitian menunjukkan bahwa MM-Kit-GTMAC telah berhasil disintesis. Keberadaan GTMAC meningkatkan kestabilan MM-Kit dan menggeser pH optimum pada adsorpsi anion Cr(VI) dari 3,0 ke 4,0. Studi kinetika dan isoterm adsorpsi menunjukkan bahwa adsorpsi anion Cr(VI) pada MM-Kit-GTMAC (dengan perbandingan massa Kit:GTMAC = 1:6) mengikuti model kinetika orde dua semu dengan konstanta laju  $10,2 \times 10^{-5} \text{ mol mg}^{-1} \text{ menit}^{-1}$  dan isoterm Langmuir dengan kapasitas adsorpsi  $104,17 \text{ mg g}^{-1}$ , yang potensial untuk diaplikasikan pada pengolahan limbah tercemar anion Cr(VI).

Kata kunci: anion Cr(VI), adsorpsi, kitosan, GTMAC, material magnetik

## ABSTRACT

### **MODIFICATION OF CHITOSAN-COATED IRON SAND MAGNETIC MATERIAL WITH GLYCIDYLTRIMETHYLAMMONIUM CHLORIDE FOR Cr(VI) ADSORPTION**

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Modification and characterization of coating quarternary ammonium salt modified chitosan on iron sand magnetic material as adsorbent for Cr(VI) anion have been performed. The research was begun with isolation of magnetic materials (MM) from iron sand, synthesis of magnetic material-chitosan (MM-Kit), and magnetic material-chitosan modified by glycidiltrimetilammonium chloride (MM-Kit-GTMAC) with various mass ratio. Products was characterized by FT-IR, XRD, SEM-EDX, and VSM. Adsorption studies were carried out using a batch system with variation of pH, time, and initial Cr(VI) anion concentration. The unadsorbed Cr(VI) anion was analyzed by AAS.

The results showed that MM-Kit-GTMAC was successfully synthesized. The presence of GTMAC increased the stability of MM-Kit and shifted the optimum pH for Cr(VI) anion adsorption from 3.0 to 4.0. The study of kinetics and adsorption isotherm showed that the adsorption of Cr(VI) anion by adsorbent MM-Kit-GTMAC (with mass ratio Kit:GTMAC = 1:6) follows the pseudo second order kinetic model with the adsorption rate constant as much  $10.2 \times 10^{-5} \text{ mol mg}^{-1} \text{ minute}^{-1}$  and Langmuir isotherms with adsorption maximum capacity  $104.17 \text{ mg g}^{-1}$ , which has a potential to be applied for treatment of Cr(VI) polluted waste.

Keywords: Cr(VI) anion, adsorption, chitosan, GTMAC, magnetic material