

Tingginya kadar ion logam besi dalam air dapat dikurangi dengan proses adsorpsi. Salah satu adsorben yang digunakan adalah kitosan komposit karbon aktif. Penelitian ini bertujuan untuk menguji isoterm adsorpsi kesetimbangan ion logam Fe^{2+} dalam air dan adsorben komposit, serta kinetika adsorpsi. Komposit dibuat dengan menambahkan 10 gram karbon aktif ke dalam 1 L larutan kitosan 0.2 M. Gel kitosan karbon aktif kemudian dimasukan ke dalam campuran larutan NaOH 0.7 M untuk menghasilkan komposit *bead*. *Bead* dinetralkan menggunakan aquades dan dikeringkan menggunakan oven pada $50^{\circ}C$ selama 2 jam. *Bead* kering digunakan sebagai adsorben. Proses adsorpsi menggunakan erlenmeyer berisi larutan besi ion 50 ppm dengan dosis adsorben 0.5 gr, 1 gr, dan 1.5 gr suhu 298 K, 308 K, dan 318 K. Sampel diambil pada 5, 10, 20, 40, 60, 120, 180, dan 210 menit. Adsorben komposit *bead* yang terbentuk dianalisis dengan BET, SEM, EDX, dan FTIR. Hasil BET menunjukkan adsorben komposit memiliki pori dengan *surface area* yang lebih besar dari kitosan. Hasil XRD menunjukkan adsorben komposit berupa padatan amorf. Hasil FTIR menunjukkan kitosan berhasil terlapiskan pada karbon aktif. Hasil SEM/EDX secara umum menunjukkan ion logam Fe^{2+} berada dipermukaan adsorben. Kapasitas adsorpsi maksimum sebesar 52.90% pada dosis gram 1.5 gr. Model kinetika mengikuti pseudo orde dua semu dengan kesetimbangan mendekati model Langmuir.

Kata kunci: Adsorpsi, Kitosan, Karbon Aktif dan Ion Fe^{2+}

The high content of the iron ion in water can be reduced by adsorption process. One of the adsorbent used is a composite of chitosan activated carbon. The composites were prepared by adding 10 g of activated carbon into chitosan solution 1 L. The gels of chitosan activated carbon were then dropped into a 0.7 M NaOH solution mixture to produce composite beads. The beads were neutralized using aquadest and dried in an oven at 50°C for 2 hours. The dried bead was used as adsorbent. The adsorption process was carried out in 50 ppm iron ion solution with 0.5 g, 1 g and 1.5 g of adsorbent at operation temperature 298 K, 308 K, and 318 K. Sample were taken in 5, 10, 20, 40 60, 80 and 120 min. The adsorbent was characterized by BET, SEM, and EDX. The composite beads adsorbent were analyzed by BET, SEM, EDX, and FTIR. BET results show that composite adsorbents have pores with a larger surface area than chitosan. The XRD results showed amorphous crystal shaped composite adsorbents. FTIR results show that chitosan was successfully coated on activated carbon with a porous surface structure. SEM/EDX images confirm that after adsorption the iron ion was dispersed onto the composite bead surface. The maximum adsorption capacity was 52.90% with dosage adsorbent 1.5 g. The kinetic model follows pseudo second-order and the equilibrium fitted well with the Langmuir model.

Keywords: Adsorption, Chitosan, Activated Carbon, Composite Bead and Fe^{2+} ion