

## **PREPARASI KOMPOSIT MAGNETIT@ZEOLIT DARI PASIR BESI DAN ZEOLIT ALAM SEBAGAI ADSORBEN Cr(III)**

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### **INTISARI**

Preparasi komposit magnetit@zeolit berbahan dasar pasir besi dan zeolit alam telah dilakukan sebagai adsorben Cr(III). Pada penelitian ini bertujuan untuk mempelajari pengaruh NaOH terhadap isolasi magnetit dari pasir besi alam, mempelajari stabilitas komposit magnetit@zeolit dan penentuan  $pH_{pzc}$ , serta mengkaji kinetika adsorpsi ion logam Cr(III) dengan adsorben komposit magnetit@zeolit.

Komposit magnetit@zeolit berbahan dasar pasir besi dan zeolit alam. Magnetit diperoleh dari proses isolasi dari pasir besi menggunakan larutan NaOH dengan variasi konsentrasi 2,00; 4,00; 6,00; 8,00 M sedangkan zeolit alam diaktivasi menggunakan larutan HCl 3,00 M. Pembentukan komposit magnetit@zeolit dilakukan dengan metode kopresipitasi diawali dengan melarutkan magnetit dengan larutan HCl 37% dan ditambahkan zeolit alam teraktivasi dengan perbandingan massa 1:1 kemudian ditambahkan larutan  $NH_4OH$  12,5% hingga pH 11. Komposit dikarakterisasi dengan FTIR, XRD, SEM-EDX, TEM, VSM, diuji stabilitas dan penentuan  $pH_{pzc}$ , serta dikaji kinetika dan isoterm adsorpsinya terhadap ion logam Cr(III).

Hasil penelitian menunjukkan bahwa proses isolasi magnetit dari pasir besi menghasilkan hasil yang terbaik saat menggunakan larutan NaOH 2,00 M. Komposit magnetit@zeolit memiliki  $pH_{pzc}$  5,66 sehingga proses adsorpsi logam Cr(III) akan dilakukan pada  $pH > pH_{pzc}$ . Pengkajian kinetika dan isoterm adsorpsi menunjukkan bahwa proses adsorpsi logam Cr(III) dengan adsorben komposit magnetit@zeolit mengikuti model kinetika pseudo orde kedua dan isoterm Langmuir.

Kata kunci: adsorpsi, Cr(III), pasir besi alam, zeolit alam

***PREPARATION OF MAGNETITE@ZEOLITE COMPOSITES  
FROM IRON SAND AND NATURAL ZEOLITE AS AN  
ADSORBENT OF Cr(III)***

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**ABSTRACT**

The preparation of magnetite@zeolite composites based on iron sand and natural zeolite has been carried out as Cr(III) adsorbent. This study aims to study the effect of NaOH on the isolation of magnetite from natural iron sand, study the stability of magnetite@zeolite composites and determination of  $pH_{pzc}$ , as well as examine the adsorption kinetics of Cr(III) metal ions with magnetite@zeolite composite adsorbents.

Magnetite@zeolite composite made from iron sand and natural zeolite. Magnetite was obtained from the isolation process from iron sand using NaOH solution with various concentrations of 2.00; 4.00; 6.00; 8.00 M while natural zeolite was activated using 3.00 M HCl solution. The formation of magnetite@zeolite composites was carried out by the coprecipitation method, starting with dissolving magnetite with 37% HCl solution then activated natural zeolite with a mass ratio of 1:1 was added, followed by addition of 12.5%  $NH_4OH$  solution to pH 11. The composites were characterized by FTIR, XRD, SEM-EDX, TEM, VSM, and it were tested for stability and determination of  $pH_{pzc}$ , as well as kinetics and adsorption isotherms of metal ions Cr(III).

The results showed that the best results were obtained on the use of 2.00 M NaOH in the process of isolating magnetite from iron sand. The magnetite@zeolite composite had a  $pH_{pzc}$  of 5.66 so that the Cr(III) metal adsorption process would be carried out at  $pH > pH_{pzc}$ . The study of kinetics and adsorption isotherm showed that the process of Cr(III) metal with magnetite@zeolite composite adsorbent followed the pseudo second order kinetic model and the Langmuir isotherm.

Keywords: adsorption, Cr(III), natural iron sand, natural zeolite