

Sintesis dan karakterisasi zeolit nay dari zeolit alam Lampung sebagai adsorben ion logam kadmium (ii) dan kobal (ii) = Synthesized and characterization nay zeolite from natural zeolite Lampung as adsorben for heavy metal cadmium (ii) and cobalt (ii)

Esty Mustika Suud, author

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Abstrak

Zeolit NaY dengan bahan dasar dari Zeolit Alam Lampung ZAL telah disintesis dengan rasio molar Al_2O_3 : $10 SiO_2$: $10,6 Na_2O$: $180,3 H_2O$ dan rasio Si/Al 2,47. Sebelum mensintesis melalui proses hidrotermal dengan teknik seeding dilakukan aktivasi dan pemurnian terhadap ZAL. Langkah ini dilakukan untuk menghilangkan senyawa karbonat dan pengotor oksida besi dari zeolit. Selanjutnya, ZAL hasil pemurnian didepolimerisasi menggunakan NaOH untuk memecah atau memutuskan ikatan dalam kerangka zeolit. Zeolit NaY hasil sintesis dikarakterisasi menggunakan instrumen SEM-EDX, XRD, FTIR. Hasil XRD menunjukkan bahwa zeolit hasil sintesis merupakan zeolit NaY, walaupun kerangka sodalite juga teramati. Hasil SEM-EDX menunjukkan morfologi dari zeolit NaY. Hasil karakterisasi FTIR menunjukkan tidak adanya vibrasi dari double-six-ring. Pada penelitian ini zeolit NaY hasil sintesis memiliki nilai kapasitas tukar kation 32,97 meq/100g lebih tinggi dibandingkan dengan ZAL raw 28,01 meq/100g. Adsorpsi ion logam kadmium II dan kobal II dilakukan pada temperatur ruang, dengan volume 25mL/0,1gram zeolit dan waktu kontak 120 menit. Hasil proses adsorpsi menunjukkan kapasitas adsorpsi zeolit NaY hasil sintesis lebih tinggi dibandingkan dengan ZAL raw.

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NaY zeolite from natural zeolite Lampung had been synthesized with molar ratio of Al_2O_3 $10 SiO_2$ $10,6 Na_2O$ $180,3 H_2O$ and Si Al ratio 2,47, prior to synthesis via hydrothermal process and seeding technique ZAL was activated and purified. The purpose of this step was to remove carbonate and iron oxide which were impurities in zeolite. The purified ZAL was then depolymerized using NaOH to break the bonds within the zeolite framework. The as synthesized NaY zeolite was characterized using SEM EDX, XRD, and FTIR. XRD diffractogram shows that the as synthesized zeolite was NaY zeolite, although sodalite framework was do observed. SEM EDX characterization shows the morphology of NaY zeolite. FTIR characterization shows that there are no vibration mode for the double six ring. In this research as synthesized NaY has higher cation exchange capacity 32, 97 meq 100g compared to the raw ZAL 28,01 meq 100g . The adsorption of heavy metal cation cadmium II and cobalt II is done at room temperature, with volume 25mL per 0,1gram zeolite and consat time of 120 minutes. The result shows that the synthesized NaY zeolite has better adsorption capacity than ZAL raw.