ADSORPSI Pb(II) DAN Ni(II) DENGAN ZEOLIT ALAM DAN HASIL MODIFIKASINYA

Oleh:

Wasono
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RINGKASAN

Zeolit merupakan mineral aluminasilikat dengan struktur kerangka tiga dimensi, memiliki rongga serta saluran yang saling berhubungan menyebabkan bagian permukaannya menjadi sangat luas dan efektif sebagai adsorben. Selain itu, zeolit juga memiliki muatan negatif yang dapat berinteraksi dengan senyawa atau molekul bermuatan seperti heksadesiltrimetilamonium ($HDTMA^+$). Modifikasi zeolit dengan $HDTMA^+$ dilakukan baik terhadap zeolit alam maupun zeolit terdealuminasi untuk mengadsorpsi ion Pb(II) dan Ni(II). Zeolit terdealuminasi diperoleh dengan mereaksikan zeolit alam dengan HCL 6 M dan NH_4NO_3 2 M. Setelah itu zeolit ditambahkan $HDTMA^+$ 50 mmol/L kemudian digojog dengan kecepatan 150 rpm selama 8 jam. Hasil modifikasi terhadap kedua zeolit tersebut ditentukan melalui pengukuran dengan spektrofotometer FTIR. Uji adsorpsi terhadap ion Pb(II) dan Ni(II) dilakukan terhadap kedua zeolit termodifikasi dengan menggunakan shaker selama 24 jam pada kecepatan 150 rpm. ion Pb(II) dan Ni(II) yang tidak teradsorpsi ditentukan melalui pengukuran menggunakan AAS.

Spektra FTIR memperlihatkan bahwa modifikasi dengan $HDTMA^+$ pada zeolit alam dan zeolit alam terdealuminasi telah berhasil dilakukan. Dari penentuan menggunakan AAS dapat diperoleh kapasitas adsorpsi maksimum, konstanta kesetimbangan adsorpsi. Kapasitas adsorpsi maksimal Pb(II) dan Ni(II) adalah 138,889 mg/g dan 107,526 mg/g. Sedang konstanta kesetimbangan adsorpsi untuk Pb(II) dan Ni(II) $1{,}049.10^3$ dan $8{,}591.10^3$.

SUMMARY

Zeolite is an aluminosilicate mineral whose three dimensional frameworks in its structure, having cavities and channels which related each other causing the surfaces become wide and effective as adsorbent. Beside that, zeolite having negative charge, can interact with charge compounds or molecules such as hexadecyltrimethylammonium ($HDTMA^+$).

Modification zeolite with ($HDTMA^+$) was done for both natural zeolite and dealumiated one for Pb(II) and Ni(II) adsorption. The dealuminated natural zeolite was obtained by reacted of natural zeolite with HCL 6 M and NH_4NO_3 2 M. After that, natural zeolite and dealuminated natural zeolite were added by $HDTMA^+$ in concentration of 50 mmol/L. They were mixed on shaker at 150 rpm for 8 hours. The result of modification for both zeolites are determine using FTIR spectrophotometer. The adsorption test of Pb(II) and Ni(II) was done for both modified zeolites by mixing on shaker for 24 hours at 150 rpm. Unadsorbed Pb(II) and Ni(II) was determined by AAS.
FTIR spectra showed that modification of natural zeolite and activated natural zeolite using $HDTMA^+$ could be done well. From determination using AAS, there were obtained maximum adsorption capacities and adsorption constant. Maximum adsorption capacities for Pb(II) and Ni(II) were 138,889 mg/g and 107,526 mg/g respectively. While adsorption constant for Pb(II) and Ni(II) were $1,049.10^3$ for the furner $8,591.10^3$ for the letter.

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