



INTISARI

ADSORPSI Pb(II) MENGGUNAKAN ZEOLIT ALAM TERLAPIS OKSIDA BESI

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Telah dilakukan penelitian tentang adsorpsi Pb(II) menggunakan zeolit alam terlapis oksida besi. Penelitian ini bertujuan untuk mempelajari kemampuan zeolit alam terlapis oksida besi dalam mengadsorpsi Pb(II). Beberapa parameter yang dipelajari meliputi pH awal, kinetika adsorpsi, isoterm adsorpsi dan uji selektifitas. Karakterisasi zeolit alam terlapis oksida besi dilakukan menggunakan metode *X-Ray Diffraction* (XRD), spektrofotometri *Infra Red* (IR) dan *Gas Sorption Analyzer* (GSA).

Hasil penelitian menunjukkan bahwa oksida besi yang melapisi zeolit alam menyebabkan luas permukaan spesifik adsorben meningkat dari 17,88 m²/g menjadi 27,40 m²/g. pH optimum adsorpsi Pb(II) menggunakan zeolit alam terlapis oksida besi sebesar 6. Adsorpsi Pb(II) menggunakan zeolit alam (ZA) dan zeolit alam terlapis oksida besi (ZT) mengikuti model kinetika pseudo order dua dengan nilai k masing-masing sebesar 1,88 x 10⁻³ g/mg menit dan 2,92 x 10⁻³ g/mg menit. Kapasitas dan energi adsorpsi rata-rata diperkirakan menggunakan model isoterm adsorpsi Langmuir. Kapasitas adsorpsi ZA dan ZT secara berurutan sebesar 1,01 x 10⁻⁴ mol/g dan 1,44 x 10⁻⁴ mol/g. Energi adsorpsi pada ZA dan ZT secara berurutan sebesar 24,40 kJ/mol dan 29,58 kJ/mol, hal ini mengindikasikan adsorpsi Pb(II) pada ZA dan ZT merupakan proses kemisorpsi. Uji selektivitas adsorpsi Pb(II) dalam larutan biner Pb(II)-Zn(II) dan Pb(II)-Cu(II) menunjukkan adsorpsi Pb(II) menggunakan ZT lebih besar daripada adsorpsi Cu(II) maupun Zn(II).

Kata kunci: zeolit, oksida besi, timbal, adsorpsi dan selektivitas



ABSTRACT

THE ADSORPTION OF Pb(II) USING IRON OXIDE COATED NATURAL ZEOLITE

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A research on adsorption of Pb(II) using iron oxide coated on natural zeolite has been conducted. This research aimed to examine the ability of iron oxide coated natural zeolite in Pb(II) adsorption. Some adsorption parameters i.e. initial pH, adsorption kinetic, adsorption isotherm were examined in the adsorption processes and the selectivity testing. The characterization of iron oxide coated natural zeolite was done by using X-Ray Diffraction (XRD) method, Infra Red (IR) spectrophotometry and Gas Sorption Analyzer (GSA).

The results showed that iron oxide coated on natural zeolite contribute to an increase in the specific surface area. The specific surface area of adsorbent increased from 17.88 m²/g to 27.40 m²/g. The optimum pH of Pb(II) adsorption using iron oxide coated natural zeolite was 6. Pb(II) adsorption using natural zeolite (ZA) and iron oxide coated natural zeolite (ZT) was pseudo second order kinetic model with k value of 1.88 x 10⁻³ g/mg menit and 2.92 x 10⁻³ g/mg menit, respectively. The adsorption capacity and average adsorption energy were estimated from Langmuir isotherm model. The Pb(II) adsorption capacity of ZA and ZT were 1.01 x 10⁻⁴ mol/g and 1.44 x 10⁻⁴ mol/g, respectively. The average Pb(II) adsorption energy on ZA and ZT were 24.40 kJ/mol and 29.58 kJ/mol, respectively. The results indicated that Pb(II) adsorption using ZA and ZT was dominated by chemisorption. The Pb(II) adsorption of selectivity testing in binary system Pb(II)-Zn(II) and Pb(II)-Cu(II) show that Pb(II) adsorption using a ZT is greater than the adsorption of Cu (II) and Zn (II).

Key words : zeolite, iron oxide, lead, adsorption and selectivity