Sintesis karakterisasi dan aplikasi poli{(4 vinil piridin) KO (asam metakrilat)} sebagai adsorben selektif ion pb2 menggunakan teknik ion imprinted polymer = Synthesis characterization and application of poly {(4 vinyl pyridine)- co-(methacrylic acid)}as selective adsorbent for pb2 ion using ion imprinted polymer technique

Rahmadia Pratiwi, author

Abstrak

Imprinted polymer untuk ion Pb2+ (Pb-IIP) disintesis melalui proses self assembly antara monomer fungsional 4-vinil piridin dan asam metakrilat serta ion Pb2+ sebagai template. Kompleks template/monomer yang terbentuk dipolimerisasi menggunakan metode polimerisasi suspensi dengan pengikat silang etilen glikol dimetakrilat (EGDMA) dan inisiator 2,2?-azobis isobutironitril (AIBN). Proses leaching menggunakan HNO3 0,5 M dilakukan pada Pb-IIP hasil sintesis untuk mengelusi ion Pb2+, sehingga didapatkan rongga spesifik yang berfungsi sebagai situs pengenalan. Keberhasilan sintesis polimer dianalisis menggunakan FTIR. Puncak gugus C=C ulur vinil pada panjang gelombang 1630 cm-1 tidak muncul menandakan putusnya ikatan rangkap akibat adanya proses polimerisasi.
Hasil karakterisasi EDX menunjukkan bahwa pengompleksan dan pengelusian ion Pb2+ berhasil dilakukan yang dikonfirmasi dengan munculnya intensitas Pb sebelum dilakukan elusi dan tidak munculnya intensitas Pb setelah dilakukan elusi. Hasil karakterisasi menggunakan PSA menunjukkan distribusi ukuran partikel Pb-IIP yaitu 34,5m. Adsorben Pb-IIP diuji sifat adsorpsi serta desorpsinya dan diperoleh persen adsorpsi di atas 99% dan persen desorpsi sebesar 92,45%. Sebagai pembanding, pada non imprinted polymer (NIP) diperoleh persen adsorpsi sebesar 21,63% dan persen desorpsi sebesar 52,57%. Pb-IIP memiliki persen adsorpsi yang lebih besar terhadap Pb2+ dibandingkan dengan ion logam lainnya yaitu Ni2+, Co2+, Cu2+, dan Fe3+. Kemampuan adsorpsi maksimum pada Pb-IIP dapat dicapai saat pH 7 dan waktu kontak 60 menit. Pb-IIP dapat diaplikasikan pada sampel air di lingkungan dengan % recovery sebesar 110%.
<hr>An imprinted polymer for Pb2+ ion (Pb-IIP) was synthesized by self-assembly method using 4-vinyl pyridine, methacrylic acid as functional monomer and Pb2+ ion as template. Template/monomer complex was polymerized using a suspension polymerization method with crosslinker ethylene glycol dimethacrylate (EGDMA) and initiator 2,2'-azobis isobutyronitrile (AIBN). Pb-IIP was leached using 0.5 M HNO3 to remove Pb2+ ion that would produce the specific cavity as a recognition site. The success of synthesis was analyzed using FTIR resulting the absence of peak for C=C stretching at 1630 cm-1 indicated the bond rupture due to the polymerization process.
EDX characterization indicated that complexing and leaching of Pb2+ ion were successfully confirmed by the appearance of Pb elements prior to elution and disappearance of Pb elements after elution. PSA characterization showed the particle size distribution of Pb-IIP was 34.5 m. Adsorption and desorption process were performed on Pb-IIP adsorbent obtained > 99% for adsorption and 92.45% for desorption. NIP adsorbent used for comparison with Pb-IIP resulting 21.63% for adsorption and 52.57% for desorption. Pb-IIP had a better adsorption towards Pb2+ compared with other metal ions such as Ni2+, Co2+, Cu2+, and Fe3+. The maximum adsorption capacity of Pb-IIP could be achieved when the pH was 7 and contact times was 60 minutes. Pb-IIP could be applied to environmental water samples resulting % recovery 110%.