

Sintesis dan karakterisasi ion imprinted polymer poli 4 vinil piridin ko stirena sebagai adsorben selektif ion ni ii = Synthesis and characterization of ion imprinted polymer poli 4 vinyl pyridine co styrene as a selective adsorbent for ni ii ion

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Abstrak

Ni(II)-Ion Imprinted Polymer disintesis dengan kopolimerisasi monomer stirena dengan pengikat silang etilen glikol dimetakrilat (EGDMA) dengan adanya kompleks terner Ni(II)-dimetil glioksim-4-vinil piridin (Ni(II)-DMG-4VP) menggunakan metode polimerisasi presipitasi dengan pelarut etanol, diinisiasi oleh inisiator termal 2,2-azobisisobutironitril (AIBN). Ion Ni(II) yang menjadi ion template dilepaskan dengan HCl 6,0 M. Dilakukan pengujian parameter adsorpsi seperti pH, waktu kontak, konsentrasi ion Ni(II) serta massa adsorben. Pengujian kadar logam ditentukan dengan Spektrofotometer Serapan Atom. Uji pendahuluan adsorpsi menunjukkan kemampuan adsorpsi yang baik pada Ni(II)-IIP yaitu >99 % dan NIP (Non Imprinted Polymer) yaitu 92,56 %. Adsorpsi maksimum Ni(II)-IIP dan NIP tercapai pada pH 8 dan waktu kontak 120 menit. Adsorpsi Ni(II)-IIP dan NIP mengikuti model isoterm adsorpsi Langmuir dengan kapasitas adsorpsi maksimum Ni(II)-IIP yaitu 19,9203 mg/g sedangkan NIP yaitu 21,0971 mg/g. Uji ion pengganggu Co(II) terhadap adsorpsi ion Ni(II) menghasilkan penurunan adsorpsi dari 96,31 % (IIP) dan 82,38 % (NIP) menjadi 89,51 % (IIP) dan 74,00 % (NIP). Uji ion pengganggu Fe(III) terhadap adsorpsi Ni(II) tidak menunjukkan penurunan adsorpsi pada Ni(II)-IIP (>99%) sedangkan untuk NIP menurun dari 98,19 % menjadi 75,09 %. Uji selektifitas terhadap ion logam lain menunjukkan urutan adsorpsi yaitu Ni(II) > Cu(II) > Fe(III) > Zn(II) > Co(II). Uji selektifitas menunjukkan ion Ni(II) dapat diserap lebih efektif dibanding logam lainnya baik dalam campuran biner kedua logam ataupun campuran kelima logam tersebut. Meskipun adsorpsi Ni(II)-IIP terhadap logam lain juga tinggi namun tidak mengganggu adsorpsi ion Ni(II) yang menunjukkan afinitas adsorben terhadap ion yang menjadi template.

Ni(II)-Ion Imprinted Polymer was synthesized by copolymerization of styrene as functional monomer and ethylene glycol dimethacrylate (EGDMA) as crosslinker in the presence of ternary complexes Ni(II)-dimethyl glyoxime-4-vinyl pyridine (Ni(II)-DMG-4VP) using precipitation polymerization method and ethanol as a solvent, initiated by thermal initiator 2,2-azobisisobutyronitrile (AIBN). Ni(II) ion used as template ion was removed by HCl 6,0 M. Adsorption parameters such as pH, contact times, concentration of Ni(II) ion, and adsorbent mass, have been studied. The amount of metal ion in aqueous samples was measured by FAAS. The initial adsorption study showed that both Ni(II)-IIP and NIP (Non Imprinted Polymer) have good capability to adsorb Ni(II)-ion resulting >99% (IIP) and 92,56 % (NIP) adsorption. Maximum adsorption was reached at pH 8 with contact times 120 minutes for both Ni(II)-IIP and NIP. Adsorption of Ni(II)-IIP and NIP followed Langmuir isotherm with maximum capacity 19,9203 mg/g (IIP) and 21,0971 mg/g (NIP). Interference study for Co(II) ion showed that adsorption of Ni(II) ion decreased slightly from 96,31 % (IIP) and 82,38 % (NIP) to 89,51% (IIP) and 74,00 % (NIP). Interference study for Fe(III) showed that Ni(II) adsorption did not decrease for Ni(II)-IIP while NIP showed decrease from 98,19 % to 75,09 %. Selectivity studies showed adsorption in order Ni(II) > Cu(II) > Fe(III) > Zn(II) > Co(II). Ni(II) ion could be adsorbed more effective in binary mixed of two ions or when all of them were mixed.

Although high percent adsorption of Ni(II)-IIP was also obtained for other metals, Ni(II) ion adsorption was not interfered which showed that the adsorbent has adsorption affinity towards template ion.</i>