

Athiroh, A., 2016, Modifikasi Elektroda Pasta Karbon dengan *Imprinted* Zeolit sebagai Sensor untuk Analisis Kreatin secara Potensiometri. Skripsi di bawah bimbingan Dr. Miratul Khasanah, M.Si. Dan Dr. Abdulloh, M.Si. Departemen Kimia, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya

ABSTRAK

Elektroda pasta karbon dengan *imprinted* zeolit telah dikembangkan sebagai sensor untuk analisis kreatin secara potensiometri. Tujuan penambahan *imprinting* zeolit dilakukan untuk meningkatkan selektivitas elektroda. Pada penelitian ini digunakan zeolit TS-1 yang disintesis dengan perbandingan mol TEOS, TiO₂, TPAOH, dan H₂O sebesar 1:0,017:0,24:21,2. Sedangkan *imprinted* zeolit disintesis menggunakan perbandingan mol kreatin/Si = 0,0306, yang kemudian kreatin diekstraksi dari kerangka zeolit menggunakan air panas. Elektroda pasta karbon-*imprinted* zeolit dibuat dengan perbandingan massa karbon aktif, IZ, dan parafin sebesar 55:5:40. Elektroda pasta karbon-*imprinted* zeolit menunjukkan kinerja optimum pada pH 5. Kinerja elektroda pasta karbon termodifikasi *imprinted* zeolit dinyatakan dengan nilai faktor Nernst 27,31 mV/dekade, jangkauan pengukuran 10⁻⁹ – 10⁻⁴ M dengan koefisien korelasi kurva kalibrasi 0,973, limit deteksi atas sebesar 5,53 x 10⁻⁵ M dan limit deteksi bawah sebesar 1,3 x 10⁻⁸ M. Elektroda memiliki ketelitian yang dinyatakan dengan koefisien variasi sebesar 1,13% - 1,43% dengan nilai akurasi sebesar 33,0-109,6%. Waktu respon elektroda terhadap kreatin sebesar 100 detik, sedangkan waktu hidupnya dinyatakan dengan waktu pemakaian yaitu hingga 83 kali. Elektroda sangat selektif terhadap kreatin dalam larutan yang mengandung matriks berupa urea.

Kata kunci : kreatin, elektroda pasta karbon, imprinted zeolit, potensiometri

Athiroh, A., 2016, Modification of Carbon Paste with Imprinted Zeolite Electrode as the Sensor to Analyze Creatine by Potentiometry. The script was under guidance of Dr. Miratul Khasanah, M.Si. and Dr. Abdulloh, M.Si. Department of Chemistry, Faculty of Science and Technology, Airlangga University, Surabaya

ABSTRACT

Carbon paste with imprinted zeolite electrode have been developed as the sensor to analyze creatine by potentiometry. The purpose of adding imprinting zeolite is to increase electrode selectivity. Zeolite TS-1 was synthesized by mole ratio of TEOS, TiO₂, TPAOH, and H₂O is 1 : 0,017 : 0,24 : 21,2. Imprinted zeolite was synthesized by mole ratio of creatine/Si = 0,0306, and then creatine was extracted from zeolite framework by boiling water. Carbon paste with imprinted zeolite electrode was made by mass ratio of carbon, IZ, and paraffin is 55 : 5 : 40. Carbon paste with imprinted zeolite electrode showed the optimum performance on 5. The performance of Carbon paste with imprinting zeolite modification was showed on Nernst factor of 27,31 mV/dekade, range of measurement was 10⁻⁹ – 10⁻⁴ M with the calibration's coeficien corelation curve was 0.973, the upper limit of detection was 5.53 x 10⁻⁰⁵ M and the under limit of detection was 1.3 x 10⁻⁰⁸ M. The electrode had good precision values that was showed by coeficien of variation 1,13% - 1,43% with accuracy of 33.0% - 109.6%. The response time electrode toward creatine was 100 second and the life time was showed by timing which was used until 83 times. The electrode very selective toward creatine in the solution that containing matrix in the form of urea.

Keywords : creatine, carbon paste electrode, imprinted zeolite, potentiometry