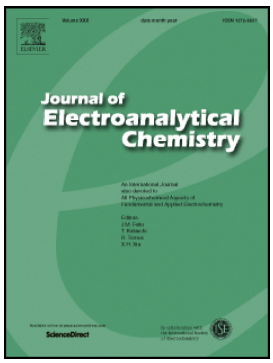

Electrochemical sensor based on molecularly imprinted polymer/ reduced graphene oxide composite for simultaneous determination of uric acid and tyrosine

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PII: S1572-6657(18)30106-1
DOI: https://doi.org/10.1016/j.jelechem.2018.02.022
Reference: JEAC 3874

To appear in: *Journal of Electroanalytical Chemistry*

Received date: 16 September 2017
Revised date: 27 January 2018
Accepted date: 9 February 2018

Please cite this article as: Weihua Zheng, Min Zhao, Weifen Liu, Shangmin Yu, Liting Niu, Gengen Li, Haifeng Li, Weilu Liu , Electrochemical sensor based on molecularly imprinted polymer/reduced graphene oxide composite for simultaneous determination of uric acid and tyrosine. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Jeac(2017), https://doi.org/10.1016/j.jelechem.2018.02.022

Electrochemical sensor based on molecularly imprinted polymer/reduced graphene oxide composite for simultaneous determination of uric acid and tyrosine

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Abstract:

This work reported a molecularly imprinted polymer (MIP)/reduced graphene oxide (RGO) composite for simultaneous determination of uric acid and tyrosine. The MIP layer was electropolymerized on the RGO modified electrode using a novel monomer of 2-amino-5-mercapto-1, 3, 4-thiadiazole and the dual template of uric acid and tyrosine. The integration of MIP with RGO resulted in the regular nanostructure and large surface area of the sensing interface. The sensing mechanism of the sensor can be explained by first recognizing the target molecules and then catalyzing the oxidation reactions on the MIP/RGO composite. The electrochemical behavior of uric acid and tyrosine on the MIP/RGO composite was evaluated. Influencing factors, including the electropolymerization scanning cycles, monomer/template ratio, and pH values were optimized. Under the optimal condition, the sensor exhibits wide linear ranges for uric acid (0.01μM ~ 100 μM) and tyrosine (0.1μM ~ 400 μM) with detection limits of 0.0032μM and 0.046μM, respectively. In addition, this MIP/RGO composite was applied to detect uric acid and tyrosine in serum and urine samples.

Keywords: molecularly imprinted polymer; reduced graphene oxide; 2-amino-5-mercapto-1, 3, 4-thiadiazole; uric acid; tyrosine