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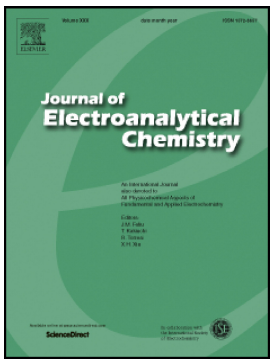

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PII: S1572-6657(18)30510-1
DOI: doi:10.1016/j.jelechem.2018.07.043
Reference: JEAC 12525

To appear in: *Journal of Electroanalytical Chemistry*

Received date: 22 May 2018
Revised date: 21 July 2018
Accepted date: 24 July 2018

Please cite this article as: Qiwen Wang, Jessie Khungwa, Ling Li, Yue Liu, Xiaohong Wang, ShengTian Wang , Fabrication of polyoxometalate/GO/PDDA hybrid nanocomposite modified electrode and electrocatalysis for nitrite ion, ascorbic acid and dopamine. Jeac (2018), doi:10.1016/j.jelechem.2018.07.043

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ACCEPTED MANUSCRIPT

Fabrication of polyoxometalate/GO/PDDA hybrid nanocomposite modified electrode and electrocatalysis for nitrite ion, ascorbic acid and dopamine

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ABSTRACT: Based on self-assembly and electrodepositing, a two-dimensional $PMo_{10}V_2$/GO/PDDA hybrid nanocomposite modified glass carbon electrode (GCE) was successfully fabricated for the first time. Graphene oxide (GO), PDDA, and $PMo_{10}V_2$ have been modified on GCE surface. Analysis by SEM and FTIR, GO has provided larger specific surface area for improving electrocatalysis activity of $PMo_{10}V_2$. The electrochemical behavior and electrocatalysis of the modified electrode were studied by detailed characterization of cyclic voltammetry (CV) and amperometric (i-t) methods. The experimental results demonstrated that $PMo_{10}V_2$/GO/PDDA/GCE has high stability, fast response, and good electrocatalytic activity towards the oxidation of nitrite ion (NO_2^-), ascorbic acid (AA), and dopamine (DA) compared to GCE, PDDA/GCE, and GO/PDDA/GCE respectively. Their concentrations are linearly proportional to the amperometric signals. The correlation coefficients of NO_2^-, AA, and DA are 0.999, 0.998, and 0.998 respectively. The detection limits were estimated to be 0.45 µM, 0.03 µM, and 0.18 µM for NO_2^-, AA, and DA with the signal to noise ratio of 3. Almost no interference effect was observed for sensing of NO_2^-, AA, and DA in the presence of each other. The proposed modified electrode was employed for the determination of the NO_2^-, AA, and DA level in human blood serum with recoveries between 97.35% and 104.2%.

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