Electrochemical Sensor based on Nano-Perovskite/Ionic Liquid Crystal Modified Carbon Paste Electrode for Effective Determination of Hydroquinone and Catechol

Ekram H. El-Ads, Nada F. Atta*, Ahmed Galal, Nada A. Eid

Chemistry Department, Faculty of Science, Cairo University, 12613 Giza, Egypt

*E-mail: anada@sci.cu.edu.eg

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An effective and facile method for the simultaneous determination of dihydroxy-benzene isomers, hydroquinone "HQ" and catechol "CC", at NdFeO₃ nano-perovskite/ionic liquid crystal modified carbon paste electrode in presence of sodium dodecyl sulfate (NFILCCP-SDS) is introduced. The proposed nano-composite offered high current responses and low detection limits due to the inherent catalytic properties of its individual modifiers. The proposed sensor has high electro-catalytic activity toward simultaneous determination of HQ and CC in the linear dynamic range of 10 $\mu\text{mol L}^{-1}$ to 180 $\mu\text{mol L}^{-1}$ with correlation coefficients 0.989 and 0.989; detection limits of 0.118 $\mu\text{mol L}^{-1}$ and 0.252 $\mu\text{mol L}^{-1}$ and quantification limits of 0.392 $\mu\text{mol L}^{-1}$ and 0.840 $\mu\text{mol L}^{-1}$, respectively. Three isomers; HQ, CC and resorcinol RC were simultaneously identified with good potential peaks separation. The determination of HQ and CC in presence of interfering species was also successful. Real sample analysis in tap water was achieved with acceptable recovery.

Keywords: Hydroquinone; Catechol; Tap water; NdFeO₃ perovskite; Carbon paste electrode.

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