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

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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 µmol L⁻¹ to 180 µmol L⁻¹ with correlation coefficients 0.989 and 0.989; detection limits of 0.118 µmol L⁻¹ and 0.252 µmol L⁻¹ and quantification limits of 0.392 µmol L⁻¹ and 0.840 µmol 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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