A promising photoelectrochemical sensor based on a ZnO particle decorated N-doped reduced graphene oxide modified electrode for simultaneous determination of catechol and hydroquinone

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This paper describes the two-step synthesis of a nitrogen-doped reduced graphene oxide –ZnO (N-doped RGO–ZnO) nanocomposite and its photo electrochemical application. The novel photo electrochemical sensor fabricated from this ZnO–N-doped RGO nanocomposite exhibits superior performance over a glassy carbon or nitrogen-doped reduced GO nanocomposite for the simultaneous determination of hydroquinone (HQ) and catechol (CC). Cyclic voltammetry (CV) studies reveals that the N-doped RGO–ZnO electrode under optimal conditions shows a peak potential separation between HQ and CC of up to 112 mV in the presence of light, which is larger than an N-doped RGO electrode under the same conditions. Square wave voltammetry (SWV) studies of a system with co-existing HQ and CC show that the N-doped RGO–ZnO modified electrode exhibits a wide linear response range of 2–900 mM and 2–600 mM, respectively, with detection limits (S/N = 3) of 10 nM and 10 nM, respectively. The results demonstrate that the N-doped RGO–ZnO is a more robust and advanced carbon electrode material providing a promising platform.