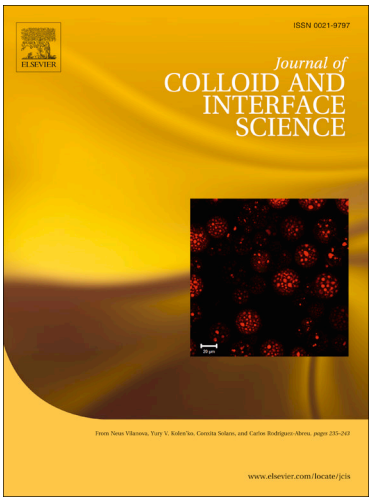

Low-cost screen-printed electrodes based on electrochemically reduced graphene oxide-carbon black nanocomposites for dopamine, epinephrine and paracetamol detection

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ABSTRACT

A green approach for the preparation of carbon black (CB) and electrochemically reduced graphene oxide composite (ERGO) is described based on screen printed carbon electrodes (SPCEs) fabricated on poly(ethylene terephthalate) (PET) as electrochemical sensors. This approach leads to a heterogeneous hydrophilic surface with high concentration of defect sites according to scanning electron microscopy, contact angle and Raman spectroscopy measurements. The SPCE/CB-ERGO sensor was tested with dopamine (DA), epinephrine (EP) and paracetamol (PCM), exhibiting an enhanced electrocatalytic performance compared to the bare SPCE. It displayed a wider linear range, lower limit of detection and a remarkably higher analytical sensitivity, *viz.* 1.5, 0.13 and 0.028 A L mol^{-1} for DA, EP and PCM, respectively, being also capable of simultaneous determination of the three analytes. Such high performance is demonstration that SPCE/CB-ERGO may serve as generic platform for cost-effective flexible electrochemical sensors.

Keywords: Screen-printed electrodes, composites, low-cost sensors, graphene and carbon black.