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Abstract

Carbon-based materials are currently at the forefront of materials research due to their outstanding physical, mechanical and electrical properties and exceptional catalytic/electro-catalytic activities. The ability to be dispersed in various polymer matrix leads to a new class of polymer nanocomposites with a wide range of applicability (e.g. food packaging, biosensors, water treatment or drug delivery). The main goal of this study was to provide a facile, rapid, inexpensive way for the green, single-step and large-scale preparation of chitosan/graphene nanomaterial, through electrochemical exfoliation of graphite rods, without the use of any organic solvent. The obtained nanocomposite was characterized from morphological and structural point of view. The X-Ray Diffraction investigation indicates that the obtained material appears as a mixture of few-layer graphene (FLG - 73.75%), multi-layer graphene (MLG - 22.38%) and a small chitosan contribution (3.87%). Furthermore, the applicability of chitosan/graphene-glassy carbon modified electrode for accurate detection and quantification of Sunset Yellow was also reported. As expected, the modified electrode exhibits a wide linear range (2×10^{-7} - 10^{-4} M) and low detection limit (LOD = 6.66×10^{-8} M; S/N = 3).

Keywords: *electrochemical detection; Sunset Yellow; modified electrodes; electrochemical exfoliation*