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&

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XII WRTCS

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Improvement of electrochemical properties of ZnO nanoparticles via composites with graphene oxide

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Due to their tunable multifunctional properties zinc oxide (ZnO) based materials have attracted extensive scientific and technological attention. Since they combines different properties such as electrochemical activities, chemical and photochemical stability, non-toxicity, biocompatibility, etc. ZnO-based materials have been used for variety of applications in electronics, opto-electronics, biosensing, bioimaging, drug and gene delivery, implants, antimicrobial and anticancer agents, as well as sensing in environmental applications.
The main aim of this study was to improve efficiency of ZnO particles toward both electrochemical sensing for environmental application and electrocatalysis. To vary electrochemical properties, series of zinc oxide/graphene oxide (ZnO/GO) composites were synthesized by microwave processing of precipitate in the presence of a different amount (0.1 and 0.5 wt.%) of previously prepared GO as well as reduced GO (rGO). The particles crystal structure and phase composition were investigated by X-ray diffraction and Raman spectroscopy. The particles morphology was observed with FE–SEM while the textural properties (BET surface area and pore volume) were determined by low-temperature adsorption-desorption of nitrogen. The optical properties were studied using UV–Vis DRS and PL spectroscopy. The electrochemical sensing activity of ZnO, ZnO/GO and ZnO/rGO electrodes was tested for detection of bisphenol A in water solution while electrocatalytic activity was tested for water splitting when samples were used as anode materials and evaluated by linear sweep voltammetry in several different electrolytes. Differences in electrochemical activity between the composites were correlated with presence of GO, particles morphology and textural properties.