

Reduced graphene oxide nano-composites layer on fiber optic tip sensor reflectance response for sensing of aqueous ethanol

ABSTRACT

In this study, the used of tapered optical fiber tip as sensors coated with reduced Graphene Oxide (rGO) is investigated. The resultant rGO nanocomposites coated on the tapered fiber sensor were characterized by X-ray Diffraction (XRD), Raman spectroscopy, and field emission scanning electron microscopy (FESEM). Optimization of the rGO layer and the tapering parameters are found and the sensing capability of the device is tested using different concentrations of ethanol in water. The nanocomposite layer improved the performance of the sensor by demonstrating high sensitivity to aqueous ethanol when interrogated in the visible region using a spectrometer in the optical wavelength range of 500-6700 nm. The reflectance response of the rGO coated fiber tip reduced linearly, upon exposure to ethanol concentrations ranging between 20-80 %.

Keyword: Reduced graphene oxide; Optical fiber sensor; Reflectance