**Abstract**

Recently, efforts have been made to develop technologically feasible graphene-based devices. The development of composite materials based on graphene and natural polymers provides an ideal material in the biomedical field. However, the lack of good mechanical and thermal properties limits its applications. This drawback could be overcome by the reduction of graphene oxide into reduced graphene oxide (RGO). The RGO combined with the polymer helps to increase the conductivity of nanocomposites which thereby enhances the properties of the material to suit commercial applications. This present work is based on the investigation of the electrochemical behaviour of reduced graphene oxide/Chitosan nanocomposite synthesized by chemical reduction method. The synthesized rGO/CS nanocomposites are characterized using ultraviolet–visible (UV-Vis) spectral analysis, Fourier transform infrared (FT-IR) spectral analysis, X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM) analysis. The surface charge as well as stability of the nanocomposites is examined by electrochemical characterization using cyclic voltammetry technique. The analytical responses and the redox mechanisms are evaluated which shows high current response for RGO/Chitosan nanocomposites compared to pure RGO nanosheets. This suggests that RGO/Chitosan nanocomposites have excellent electrochemical behaviour and is further applied for bio sensing applications.