**Abstract**

 Recently, metal nanoparticles incorporated carbon nanostructures have tremendous applications in the field of nanosensor and technologies. In the proposed work, silver nanoparticles (Ag) decorated reduced graphene oxide nanosheets (rGONS) (rGONS-Ag) are synthesized and developed for the sensitive detection of ortho-Nitrophenol (o-NP) using electrochemical techniques. The rGONS-Ag nanocomposites are synthesized through chemical reduction method. The physical and electrochemical behaviour of the synthesized rGONS-Ag nanocomposites are characterized by using Fourier-transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD), Scanning electron microscope (SEM), Energy dispersive X-ray spectroscopy (EDAX), Transmission electron microscopy (TEM) and Cyclic voltammetry (CV) techniques. The X-ray diffraction analysis reveals the formation of well crystalline silver nanoparticles (AgNp’s) on the surface of rGO nanosheets with the crystallite size of about 22.775 nm. The morphological analysis reveals the formation of well distributed cubic shape AgNp’s on the surface of rGO nanosheets. The rGONS-Ag nanocomposites modified glassy carbon electrode (GCE) shows the good electrochemical detection performance for ortho-Nitrophenol (o-NP) with the linear detection range from 2 mM to 8 mM and with the sensitivity of about 0.221 mA mM-1 cm-2.