

In the present work, preparation of titanium dioxide coated graphene (TiO₂/graphene) and the use of this nanocomposite modified electrode for electrochemical biosensing applications were detailed. The nanocomposite was prepared with radio frequency (rf) rotating plasma method which serves homogeneous distribution of TiO₂ onto graphene. TiO₂/graphene was characterized with scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS) and X-ray diffraction (XRD) analysis. Then, this nanocomposite was dissolved in phosphate buffer solution (pH 7.4) and modified onto disposable pencil graphite electrode (PGE) by dip coating for the investigation of the biosensing properties of the prepared electrode. TiO₂/graphene modified PGE was characterized with SEM, EDS and cyclic voltammetry (CV). The sensor properties of the obtained surface were examined for DNA and DNA-drug interaction. The detection limit was calculated as 1.25 mg L⁻¹ (n=3) for double-stranded DNA (dsDNA). RSD% was calculated as 2.4% for three successive determinations at 5 mg L⁻¹ dsDNA concentration. Enhanced results were obtained compared to the ones obtained with graphene and unmodified (bare) electrodes. (C) 2016 Elsevier B.V. All rights reserved.