

Designing a Genosensor using graphene Oxide, Gold Nanoparticles Nanocomposite

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Abstract—We herein report the synthesis of gold nanoparticles decorated-graphene oxide sheets by a one-pot solution-based method. Further, polymer was introduced into this gold nanoparticle decorated graphene oxide sheets to prepare a nanocomposite by electropolymerization using potentiodynamic mode. The synthesized nanocomposite was characterized by transmission electron microscopy, energy dispersive X-ray spectroscopy, scanning electron microscopy, thermogravimetric analysis and Raman spectroscopy. It has been found that gold nanoparticles of ca. 5 nm are uniformly dispersed on the surface of graphene oxide, and provide a high electrochemical active surface area. The surface morphology studies shows that after introduction of polymer the morphology of prepared material changes from nanoflowers to nanostars and then to nanosheets with increase in the scan rate (20-200 mV/s). The prepared nanocomposite electrode was further used to develop a sensor technology for monitoring *E.coli* bacteria in polluted water samples. The genosensor shows the response time of 60 s with high sensitivity of 1×10^{-15} M and linear range from 1×10^{-15} to 1×10^{-6} M.