2nd International Conference on
Nanostructured Materials & Nanochemistry
November 02-03, 2018 | San Francisco, USA

The enhanced electro-activity of poly 2, 5-dimethoxyaniline doped with gold nanoparticles-dotted nitrophenyl azo functionalized graphene

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Poly 2, 5-dimethoxyaniline (PDMA) is doped with gold nanoparticle dotted 4-nitrophenyl azo functionalized graphene ($AuNp/G\text{-}PhNO_2$) nano-catalyst to enhance its interfacial heterogeneous electron transfer rate. The nanocomposite was electro-deposited on glassy carbon (GC) electrode surface depicted as $GC/PDMA/AuNp/G\text{-}PhNO_2$. Comparative voltammetric interrogation of the platform in 1.0M hydrochloric acid showed enhanced electro-activity. It also exhibited quasi-reversible electrochemistry ($E^{o\prime}$=235mV) in phosphate buffer saline solution (pH 7.2) involving one electron process. Its charge transfer resistance (Rct) from electrochemical impedance spectroscopy profile monitored with ferro/ferricyanide ($Fe(CN)6^{3-/4-}$) redox probe, decreased by 81% compared to GCE/PDMA indicating that it was much more conducting than its pristine form. This new nano-structured composite is stable, cheap, easy to produce and a suitable electron transfer mediator which can be applied in the fabrication of electrochemical sensors.

Biography

Christopher Edozie Sunday is a seasoned analytical chemist, university lecturer, nanotechnologist and quality control manager, having multiple years of line production, laboratory, dielectric science and sensor technology experience in the industry and academia. He completed his PhD in Electrochemistry and Nanotechnology from the University of Western Cape, South Africa in 2014. As a Postdoctoral Research Fellow, he has published and co-authored more than 19 papers in reputed journals. His research focus involves the development of novel 'smart' nanomaterials, which can be applied in fabricating ultrasensitive electrochemical sensing platforms or sensor chips, for resolving basic diagnostic challenges in biomedical analysis and monitoring environmental pollutions e.g. real-time detection of persistent poly-aromatic pollutants in water; biomarkers for cancers, tuberculosis and other medical conditions.

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