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Application of Carbon nanotube-pencil graphite for fabrication of immunosensor

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Remarkable potential has been observed for carbon nano tubes (CNTs) due to structural, mechanical, electrical, and thermal properties and its application as sensing material in pressure, flow, thermal, gas, optical, mass, position, stress, strain, chemical, and biological sensors. CNTs present high stability on its unique structure, only few concentrated acids are capable of breaking the bonds between carbon atoms. Therefore, functionalized multiwall (MW) CNTs have been used for the fabrication of low cost immunosensor based on pencil graphite (Grp). MWCNTs have been covalently immobilized onto pencil graphite (6H, 2mm × 5mm) using octadecanthiol. Immunosensor has been fabricated by covalently immobilizing anti-BSA (Ab) using aniline as linking agent. Fabricated Ab-MWCNTs-Grp immunoelectrode has been characterised using cyclic voltammetry, square wave voltammetry and Fourier Transfor InfraRed spectrocospy. Fabricated immunosensor Ab-ANI-MWCNTs-Grp has been successfully able to detect BSA using square wave voltammetry. The fabricated immunoelectrode is found to be highly specific for BSA and did not show any non specific binding with other other protein such as albumin. The excellent performance of the immunoelectrode can be attributed to large surface-to-volume ratio, low cost, conductivity and good biocompatibility of aniline leading to enhanced the antibody immobilization and improved direct electron transfer between the surface and MWCNTs-Grp matrix of electrodes.

Biography

Kavita Arora is working as Assistant Professor in Advanced Instrumentation Research Facility, Jawaharlal Nehru University, New Delhi, India. She is engaged in the research for the development of cost effective and highly sensitive biosensors for pathogens and pesticide detection. She is recipient of Innovative Young Biotechnologist Award (IYBA) 2008 form Department of Biotechnology, Ministry of Science and Technology, Govt. of India. Her doctoral work was focused on "Studies on Application of Conducting Polymers to Genosensors" for which she was awarded GC Jain Memorial Best PhD thesis Award 2009 by Material Research Society of India. She carried her doctorate at Department of Biochemical Engineering and Biotechnology Indian Institute of Technology Delhi, India in collaboration with Biomolecular Electronics and Conducting Polymer Research Group, National Physical Laboratory, New Delhi. During her PhD and postdoctoral period she published 13 research papers in international peer review journal having impact factor 43.25. Her publications have been published as research highlight by Nature India, Chemical Technology & Chemistry World by RSC publications.

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