A Mexacarbate Electrochemical Biosensor on Carbon Materials Based on a Functionalized Multiwalled Carbon Nanotube Modified Glassy Carbon Electrode

J. Tharini^{1,*}, Tse-Wei Chen^{2,3}, Shen-Ming Chen^{2,*}, R. Saraswathi⁴,
Mohamed S. Elshikh⁵, Noura M. Darwish⁶, Syang-Peng Rwei^{3,7}

¹ Sethu Institute of Technology, Pulloor-626115, Kariapatti, TN, India

² Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taipei 106, Taiwan.

³ Research and Development Center for Smart Textile Technology, National Taipei University of Technology, Taipei 106, Taiwan, ROC

⁴ Department of Materials Science, School of Chemistry, Madurai Kamaraj University, Madurai - 625 021, Tamilnadu, India

⁵ Department of Botany and Microbiology, College of Science, King Saud University, P.O. Box 2455 Riyadh 11451, Saudi Arabia.

⁶ Biochemistry Department, Ain Shams University, Cairo, Egypt.

⁷ Institute of Organic and Polymeric Materials, National Taipei University of Technology, Taipei 106, Taiwan, ROC

*E-mail: smchen78@ms15.hinet.net (Shen-Ming Chen), tharinichem@gmail.com (J. Tharini)

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The commercial multi-walled carbon nanotube (MWCNT) was carboxylated using sulphuric and nitric acid and characterized by various techniques such as scanning electron spectroscopy, Infra-red spectroscopy and atomic force microscopy. The acid functionalized multiwalled carbon nanotube serves as the effective matrix for the sensing of carbamate pesticide namely mexacarbate. The electrochemical oxidation of mexacarbate at GCE and MWCNT/GCE follows heterogeneous electron transfer reaction. Different experimental parameters such as the effect of scan rate and pH were studied. Rotating disk electrode voltammetry studies confirm the one-electron transfer reaction. The sensor calibration plot for mexacarbamate was constructed by means of pulse technique. The acid functionalized multiwalled carbon nanotube sensor was applied to real water sample with the recovery percentage of 85-89%.

Keywords: Mexacarbate, differential pulse voltammetry, multi-walled carbon nanotube, glassy carbon electrode, calibration plot

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