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with International Participation

BOOK OF ABSTRACTS



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Voltage cycling induced surface changes for enhancing sensing characteristics of graphene paste modified screen-printed electrodes

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Graphene is a material with extraordinary chemical and physical properties and due to them is emerging as a promising material for a wide range of applications. Among them is the application for electrode material or surface modification of electrochemical sensors [1]. Using voltage cycling in electrolyte solution, it is possible to induce surface changes in electrodes modified with graphene paste. Induced surface changes cause enhancement of electrochemical sensing characteristics. In this study, screen-printed electrode with a graphene paste modified surface is prepared and electrochemical sensing characteristics are investigated. The electrode surface is investigated by Raman spectroscopy, energy-dispersive X-ray spectroscopy, and scanning electron microscopy before and after voltage cycling treatment. After voltage cycling electrode shows enhanced sensing characteristics, higher heterogeneous electron transfer rate, lower electron transfer resistance, lower capacitance, and higher sensitivity. Raman spectroscopy indicates a higher amount of available basal and edge plane graphene, while energy dispersive X-ray spectroscopy indicates the presence of intercalated oxygen species.

Keywords: screen-printed electrodes, graphene paste, surface modification, sensing characteristics enhancement