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Glutamate biosensor based on carbon nanowalls grown using plasma enhanced chemical vapor deposition MASAKAZU TOMATSU, MINEO HIRAMATSU, Meijo University, HIROKI KONDO, MASARU HORI, Nagoya University — Carbon nanowalls (CNWs) are composed of few-layer graphene standing almost vertically on the substrate. Due to the large surface area of vertical nanographene network, CNWs draw attention as platform for electrochemical sensing, biosensing and energy conversion applications. In this work, CNWs were grown on nickel substrate using inductively coupled plasma with methane/Ar mixture. After the CNW growth, the surface of CNWs was oxidized using Ar atmospheric pressure plasma to obtain super-hydrophilic surface. For the biosensing application, the surface of CNWs was decorated with platinum (Pt) nanoparticles by the reduction of hydrogen hexachloroplatinate (IV) solution. The resultant Pt particle size was estimated to be 3-4 nm. From the XPS analysis, pure Pt existed without being oxidized on the CNW surface. Electrochemical surface area of the Pt catalyst was evaluated by cyclic voltammetry. Pt-decorated CNWs will be used as an electrode for electrochemical glutamate biosensing. L-glutamate is one of the most important in the mammalian central nervous system, playing a vital role in many physiological processes. Nanoplatform based on vertical nanographene offers great promise for providing a new class of nanostructured electrodes for electrochemical sensing.

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