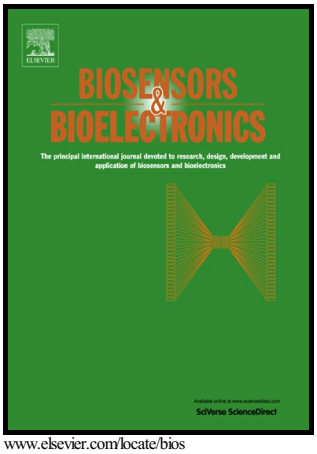

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Enhanced Electrocatalytic Performance of an Ultrafine AuPt Nanoalloy Framework Embedded in Graphene towards Epinephrine Sensing

Tran Duy Thanh[a], Jayaraman Balamurugan[a], Nguyen Thanh Tuan[a], Hun Jeong[a], Seung Hee Lee[a], Nam Hoon Kim[a], Joong Hee Lee[a,b*]

[a]Advanced Materials Institute of BIN Convergence Technology (BK21 plus Global) & Dept. of BIN Convergence Technology, Chonbuk National University, Jeonju, Jeonbuk 54896, Republic of Korea.

[b]Carbon Composite Research Centre, Department of Polymer & Nanoscience and Technology, Chonbuk National University Jeonju, Jeonbuk 54896, Republic of Korea.

[*]*Corresponding author:* Tel.: +82 63 270 2342; fax: +82 63 270 2341. jhl@chonbuk.ac.kr

Abstract

A novel hierarchical nanoporous thin film of AuPt alloy embedded in graphene (AuPt@GR) was successfully synthesized through the self-assembly of ultrafine AuPt nanoparticles (~3 nm) within GR sheets by means of a facile chemical vapor deposition (CVD) procedure without the use of any external organic capping agent and reducing agent. A binder-free sensor based on the AuPt@GR hybrid material was fabricated and its electrocatalytic activity was evaluated by using it to determine epinephrine (EP) in PBS solution (pH = 7.4) and in human serum spiked PBS solution. Amperometric measurements of the sensor response showed an extremely low limit of detection (0.9 nM at a signal-to-noise ratio of 3), high sensitivity (1628 μA mM^{-1} cm^{-2}), wide linear detection range (1.5×10^{-9} to 9.6×10^{-6} M), and negligible response to interferents. At the same time, the sensor also exhibited very long-term amperometric stability (4000 s), cyclic voltammetric stability (500 cycles), good