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PII: S0956-5663(16)30961-7
DOI: <http://dx.doi.org/10.1016/j.bios.2016.09.076>
Reference: BIOS9188

To appear in: *Biosensors and Bioelectronics*

Received date: 25 June 2016
Revised date: 20 September 2016
Accepted date: 22 September 2016

Cite this article as: Tran Duy Thanh, Jayaraman Balamurugan, Nguyen Thanh Tuan, Hun Jeong, Seung Hee Lee, Nam Hoon Kim and Joong. Hee Lee Enhanced Electrocatalytic Performance of an Ultrafine AuPt Nanoalloy Framework Embedded in Graphene towards Epinephrine Sensing, *Biosensor and Bioelectronic*, <http://dx.doi.org/10.1016/j.bios.2016.09.076>

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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 ($1628 \mu\text{A mM}^{-1} \text{cm}^{-2}$), 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

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