

Accepted Manuscript

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Authors: Su-Juan Li, Jing-Chao Zhang, Juan Li, Hong-Yuan Yang, Jing-Jing Meng, Bing Zhang



PII: S0925-4005(17)32520-0
DOI: <https://doi.org/10.1016/j.snb.2017.12.184>
Reference: SNB 23872

To appear in: *Sensors and Actuators B*

Received date: 5-9-2017
Revised date: 24-12-2017
Accepted date: 28-12-2017

Please cite this article as: Su-Juan Li, Jing-Chao Zhang, Juan Li, Hong-Yuan Yang, Jing-Jing Meng, Bing Zhang, A 3D sandwich structured hybrid of gold nanoparticles decorated MnO₂/graphene-carbon nanotubes as high performance H₂O₂ sensors, *Sensors and Actuators B: Chemical* <https://doi.org/10.1016/j.snb.2017.12.184>

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A 3D sandwich structured hybrid of gold nanoparticles decorated
MnO₂/graphene-carbon nanotubes as high performance H₂O₂ sensors

Su-Juan Li*, Jing-Chao Zhang, Juan Li, Hong-Yuan Yang, Jing-Jing Meng, Bing
Zhang*

*Henan Province Key Laboratory of New Optoelectronic Functional Materials,
College of Chemistry and Chemical Engineering, Anyang Normal University, Anyang,
455000, Henan, China*

*Address correspondence to lemontree88@163.com (S.J. Li), zhangb@zzu.edu.cn
Tel&Fax: +86-0372-2900040

Research Highlights

- A 3D sandwich structured AuNPs/MnO₂/GP-CNTs hybrid has been prepared using three steps.
- The priority of AuNPs/MnO₂/GP-CNTs hybrid to CNTs, GP-CNTs and MnO₂/GP-CNTs towards electrochemical responses of H₂O₂ was demonstrated.
- The as-prepared AuNPs/MnO₂/GP-CNTs hybrids showed excellent electrocatalytic activity towards H₂O₂ with ultrahigh detection sensitivity of 452 $\mu\text{A mM}^{-1} \text{cm}^{-2}$ and low detection limit of 0.1 μM .

Abstract: In this paper, a 3D sandwich structured hybrid of gold nanoparticles (AuNPs) decorated MnO₂/graphene (GP)-carbon nanotubes (CNTs) was prepared via three steps, and the resultant AuNPs/MnO₂/GP-CNTs hybrids was characterized by field-emission scanning electron microscopy (FESEM), transmission electron microscopy (TEM), energy-dispersive X-ray spectroscopy (EDX) detector and X-ray diffraction (XRD) spectrum, respectively. In this structure, the peeled GP nanosheets from CNTs work as linkers with CNTs to form 3D scaffold for facilitating fast electron conduction. The MnO₂ nanoparticles well distributed on the GP-CNTs

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