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www.elsevier.com/locate/bios

PII: S0956-5663(16)31009-0
DOI: <http://dx.doi.org/10.1016/j.bios.2016.10.013>
Reference: BIOS9235

To appear in: *Biosensors and Bioelectronic*

Received date: 25 July 2016
Revised date: 20 September 2016
Accepted date: 4 October 2016

Cite this article as: Pengqi Yang, Jingmeng Peng, Zhenyu Chu, Danfeng Jiang and Wanqin Jin, Facile synthesis of Prussian blue nanocubes/silver nanowire network as a water-based ink for the direct screen-printed flexible biosensor chips, *Biosensors and Bioelectronic* <http://dx.doi.org/10.1016/j.bios.2016.10.013>

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Facile synthesis of Prussian blue nanocubes/silver nanowires network as a water-based ink for the direct screen-printed flexible biosensor chips

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Abstract

The large-scale fabrication of nanocomposite based biosensors is always a challenge in the technology commercialization from laboratory to industry. In order to address this issue, we have designed a facile chemical method of fabricated nanocomposite ink applied to the screen-printed biosensor chip. This ink can be derived in the water through the *in-situ* growth of Prussian blue nanocubes (PBNCs) on the silver nanowires (AgNWs) to construct a composite nanostructure by a facile chemical method. Then a miniature flexible biosensor chip was screen-printed by using the prepared nanocomposite ink. Due to the synergic effects of the large specific surface area, high conductivity and electrocatalytic activity from AgNWs and PBNCs, the as-prepared biosensor chip exhibited a fast response (< 3 s), a wider linear response from 0.01 mM to 1.3 mM with an ultralow LOD = 5 μM , and the ultrahigh sensitivities of 131.31 and 481.20 $\mu\text{A mM}^{-1} \text{cm}^{-2}$ for the detections of glucose and hydrogen peroxide (H_2O_2), respectively. Furthermore, the biosensor chip exhibited excellent

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