

Accepted Manuscript

Title: Cathodic Photoelectrochemical Immunoassay Based on Glucose-Oxidase Mediated Biocatalysis to Inhibit the Exciton Trapping of Cupric Ions for PbS Quantum Dots

Authors: Yu-Ting Gong, Xiuming Wu, Yuming Dong, Qingyun Liu, Zaijun Li, Guang-Li Wang



PII: S0925-4005(18)30654-3
DOI: <https://doi.org/10.1016/j.snb.2018.03.156>
Reference: SNB 24441

To appear in: *Sensors and Actuators B*

Received date: 31-12-2017
Revised date: 16-3-2018
Accepted date: 25-3-2018

Please cite this article as: Yu-Ting Gong, Xiuming Wu, Yuming Dong, Qingyun Liu, Zaijun Li, Guang-Li Wang, Cathodic Photoelectrochemical Immunoassay Based on Glucose-Oxidase Mediated Biocatalysis to Inhibit the Exciton Trapping of Cupric Ions for PbS Quantum Dots, *Sensors and Actuators B: Chemical* <https://doi.org/10.1016/j.snb.2018.03.156>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Cathodic Photoelectrochemical Immunoassay Based on Glucose-Oxidase Mediated Biocatalysis to Inhibit the Exciton Trapping of Cupric Ions for PbS Quantum Dots

Yu-Ting Gong,^a Xiuming Wu,^a Yuming Dong,^a Qingyun Liu,^c Zaijun Li,^a Guang-Li Wang^{a,b,*}

^a*International Joint Research Center for Photoresponsive Molecules and Materials, Jiangnan University, Wuxi 214122, China*

^b*Public Health Research Center at Jiangnan University, Wuxi 214122, China*

E-mail: glwang@jiangnan.edu.cn

^c*College of Chemical and Environmental Engineering, Shandong University of Science and Technology, Qingdao, 266590, China*

*Corresponding author. Tel.: +86 510 85917090; Fax: +86 510 85917763.
E-mail address: glwang@jiangnan.edu.cn. (G. L. Wang)

Graphical Abstract

Herein, we induce a novel strategy for the construction of cathodic PEC immunoassay on the basis of enzymatic reaction inhibited exciton trapping for PbS quantum dots (QDs). The cathodic photocurrent of the PbS QDs sensitized NiO was inhibited by cupric ions due to the formation of exciton trapping centers of CuS on their surface. In the presence the model target of carcinoembryonic antigen (CEA), a sandwich-type immunoreaction occurred with the detection antibody labeled glucose oxidase (GOx) as the signal tracer. The enzymatic reduction of ferricyanide ($[\text{Fe}(\text{CN})_6]^{3-}$) by GOx produced ferrocyanide, which easily combined with cupric ions to form cupric hexacyanoferrate aggregates, and thus interrupted the formation of the exciton trapping centers of CuS. The developed cathodic PEC immunoassay possessed excellent analytical performances in terms of sensitivity, specificity and reproducibility.

Download English Version:

<https://daneshyari.com/en/article/7139867>

Download Persian Version:

<https://daneshyari.com/article/7139867>

[Daneshyari.com](https://daneshyari.com)