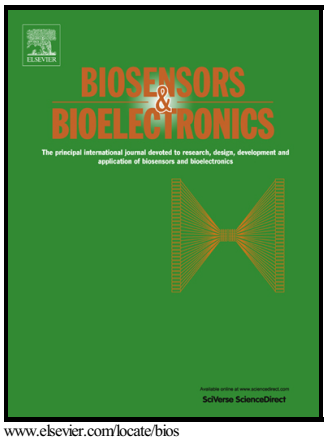
Self-enhanced electrochemiluminescence immunosensor based on nanowires obtained by a green approach

Haijun Wang, Yali Yuan, Yaqin Chai, Ruo Yuan



www.elsevier.com/locate/bios

PII: S0956-5663(14)00958-0
DOI: http://dx.doi.org/10.1016/j.bios.2014.12.016
Reference: BIOS7332

To appear in: *Biosensors and Bioelectronic*

Received date: 11 September 2014
Revised date: 17 November 2014
Accepted date: 1 December 2014

Cite this article as: Haijun Wang, Yali Yuan, Yaqin Chai and Ruo Yuan, Self-enhanced electrochemiluminescence immunosensor based on nanowires obtained by a green approach, *Biosensors and Bioelectronic,* http://dx.doi.org/10.1016/j.bios.2014.12.016

Self-enhanced electrochemiluminescence immunosensor based on nanowires obtained by a green approach

Haijun Wang, Yali Yuan, Yaqin Chai*, Ruo Yuan*

Key Laboratory of Luminescent and Real-Time Analytical Chemistry, Ministry of Education, College of Chemistry and Chemical Engineering, Southwest University, Chongqing 400715, People's Republic of China

Abstract

Co-reactant electrochemiluminescence (ECL) is a simple and effective method for sensitive detection with amplified ECL signals. However, the intermolecular interaction between the luminescent reagents and their corresponding co-reactants, which is widely applied, has disadvantages in poor stability, low efficiency of electron transfer and relatively high loss of energy. In this work, an intramolecular self-enhanced ECL is proposed to settle this problem. Firstly, palladium nanowires (PdNWs) are synthesized with a green procedure in which Lentinan (LNT), one of *β*-glucans with a triple helical conformation (t-LNT) in aqueous solution and single chains (s-LNT) at a temperature higher than 130 °C, is used as stabilizer and reducing agent. The abtined PdNWs are applied to immobilize polyamidoamine (PAMAM) dendrimer which further reacts with tris (4, 4'-dicarboxylicacid-2, 2'-bipyridyl) ruthenium (II) dichloride to form a new electrochemiluminescent derivative (PdNWs-PAMAM-Ru). In this way, the Ru (II) luminophore and its co-reactive groups (amine groups in PAMAM) exist in the same

*Corresponding author. Tel.: +86 23 68252277; fax: +86 23 68253172

E-mail addresses: yqchai@swu.edu.cn (Y. Chai), yuanruo@swu.edu.cn (R. Yuan)