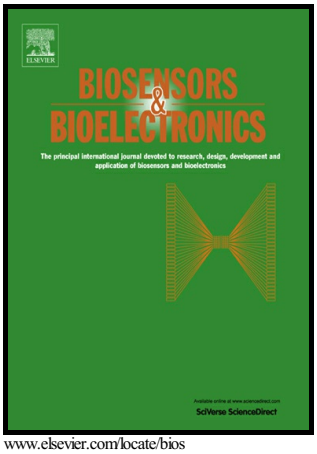

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Graphitic carbon nitride nanodots: as reductant for the synthesis of silver nanoparticles and its biothiols biosensing application

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Abstract

The graphitic carbon nitride nanodots (g-C_3N_4-dots) were synthesized by a simple electrochemical "tailoring" process from bulk graphitic carbon nitride (g- C_3N_4) under alkaline solution for the first time. Compared with the bulk g-C_3N_4, the novel g-C_3N_4-dots not only exhibit enhanced fluorescence and excellent dispersion stability in water but also show the reducibility for the reduction of Ag^+ to AgNPs at 60 °C. The biothiols can bound with Ag^+ through formation of biothiol-Ag^+ complex to consume the Ag^+ and act as capping agent to prevent the growth of AgNPs, which cause the decrease of the absorption peak of the AgNPs. Therefore, an optical sensor was developed for the detection of biothiols based on the change of the plasmon resonance absorption peak of the AgNPs. The proposed method exhibits excellent sensitivity and selectivity to biothiols with low detection limit for cysteine (Cys), homocysteine (Hcy), and glutathione (GSH) with 11.5, 16.1, and 15.5 nM, respectively. This method also has been successfully applied for the detection of biothiols in human serum with satisfactory results.

Keywords: graphitic carbon nitride nanodots; reductant; silver nanoparticles; biothiols; detection

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