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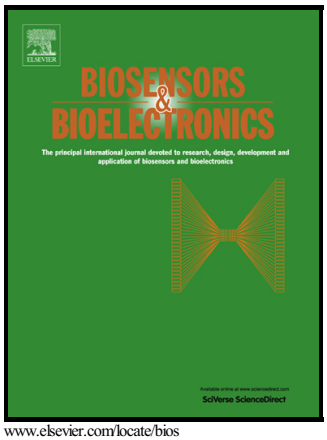

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ACCEPTED MANUSCRIPT

Ultrasensitive SERS Detection of Mercury based on the Assembled Gold Nanochains

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ABSTRACT

Mercuric ions (Hg^{2+}) mediate the transformation of single-stranded DNA to form double helical DNA by T-Hg^{2+}-T interaction between base pairs. With this strategy, DNA modified gold nanoparticles (Au NPs) were assembled into chains which were displayed remarkable surface-enhanced Raman scattering (SERS) signal. Under optimized conditions, the length of gold nanochains was directly proportional to the mercuric ions concentrations over 0.001-0.5 ng mL^{-1} and the limit of detection (LOD) in drinking water was as low as 0.45 pg mL^{-1}. With ultrasensitivity and excellent selectivity, this feasible and simple method is potentially as a promising tool for monitoring of mercury ions in food safety and environmental applications.

Keywords: Gold nanoparticle, chain, SERS, mercury ions, drinking water.

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1. Introduction

Mercury ion, as a widespread environmental pollutant, has been critically monitoring in drinking water and foods(Nordberg and Nordberg 2009). Chinese government set the maximum permissible limit (MPL) of 1 μg/L in drinking water for total mercury content (National Food Safety Standard-GB2762-2012: *Maximum Levels of Contaminants in Foods*). Traditional method for mercury ions detection

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