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www.elsevier.com/locate/talanta

PII: S0039-9140(18)30978-0
DOI: https://doi.org/10.1016/j.talanta.2018.09.068
Reference: TAL19082

To appear in: *Talanta*

Received date: 3 August 2018
Revised date: 17 September 2018
Accepted date: 18 September 2018

Cite this article as: Yongjin Zou, Jing Liang, Zhe She and Heinz-Bernhard Kraatz, Gold nanoparticles-based multifunctional nanoconjugates for highly sensitive and enzyme-free detection of *E.coli* K12, *Talanta,* https://doi.org/10.1016/j.talanta.2018.09.068

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ABSTRACT

Immobilization of proteins on a biocompatible conductive interface is highly desirable for the fabrication of biosensors. In this study, a nanocomposite has been prepared by assembling well-distributed gold nanoparticles (AuNPs) on the surface of a polypyrrole-reduced graphene oxide (PPy-rGO) composite through electrostatic adsorption. This serves as a platform for immobilization of a capture antibody, which was conjugated onto the ferrocene doped polypyrrole-gold nanoparticles (PPy@Fc/AuNPs) composite. The design and performance of the biosensor was tested against detection of a whole-cell bacteria *E. coli* K12. This nanocomposite has a high surface area, good conductivity and biocompatibility, which is shown to be very suitable for enzyme-free detection of this bacteria. Results show excellent analytical performance with a linear range from 1.0×10^{1} to 1.0×10^{7} CFU mL^{-1} and a low detection limit of 10 CFU mL^{-1}. The sensor has high selectivity, excellent

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