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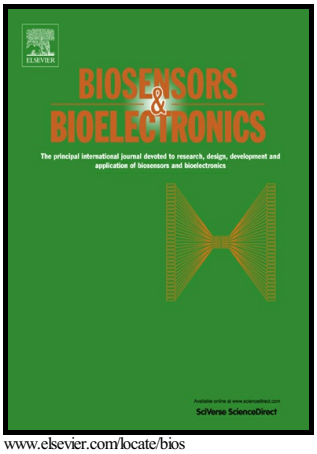

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Analyte induced AuNPs aggregation enhanced surface plasmon resonance for sensitive detection of paraquat

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Abstract

Paraquat (PQ) residue is harmful for people's health. This work fabricated an efficient approach to determine PQ sensitively. We exploited a novel surface plasmon resonance (SPR) detection system based on the analyte induced network architecture of supermolecules modified gold nanoparticles (AuNPs) on the chip surface. *para*-Sulfonatocalix[4]arene (pSC_4) were used as a recognition molecule for paraquat. PQ can mediate the aggregation of pSC_4 capped AuNPs (pSC_4-AuNPs) through the host-guest recognition, which can be used as signal amplification for PQ assay. This achievement is due to several outstanding properties of this detection system: first, local SPR and high refractive index of AuNPs can enhance the signal of SPR dramatically; second, AuNPs is more stable and biocompatible and diffusely used in colorimetric methods; third, the network AuNPs structure has unique photo characterization for enhancement of SPR. Analyte induced AuNPs aggregation amplified SPR assay shows dramatic signal enhancement ability. The detection limit for PQ was found to be 2.2 pM. This strategy provides a new concept for developing sensitive SPR sensors for the highly selective detection of small molecules.

Keywords: surface plasmon resonance, three-dimentional structure, AuNPs, colorimetric assay, paraquat detection

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