

Author's Accepted Manuscript

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PII: S0956-5663(17)30842-4
DOI: <https://doi.org/10.1016/j.bios.2017.12.037>
Reference: BIOS10182

To appear in: *Biosensors and Bioelectronic*

Received date: 7 September 2017
Revised date: 15 December 2017
Accepted date: 22 December 2017

Cite this article as: Liaojing Huang, Li Zhang, Liu Yang, Ruo Yuan and Yali Yuan, Manganese Porphyrin Decorated on DNA Networks as Quencher and Mimicking Enzyme for Construction of Ultrasensitive Photoelectrochemistry Aptasensor, *Biosensors and Bioelectronic*, <https://doi.org/10.1016/j.bios.2017.12.037>

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Manganese Porphyrin Decorated on DNA Networks as Quencher and Mimicking Enzyme for Construction of Ultrasensitive Photoelectrochemistry Aptasensor

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Abstract

In this work, the manganese porphyrin (MnPP) decorated on DNA networks could serve as quencher and mimicking enzyme to efficiently reduce the photocurrent of photoactive material 3,4,9,10-perylene tetracarboxylic acid (PTCA), which was elaborately used to construct a novel label-free aptasensor for ultrasensitive detection of thrombin (TB) in a signal-off manner. The Au-doped PTCA (PTCA-PEI-Au) with outstanding membrane-forming and photoelectric property was modified on electrode to acquire a strong initial photoelectrochemistry (PEC) signal. Afterward, target binding aptamer I (TBAI) was modified on electrode to specially recognize target TB, which could further combine with TBAII and single-stranded DNA P1-modified platinum nanoparticles (TBAII-PtNPs-P1) for immobilizing DNA networks with abundant MnPP. Ingeniously, the MnPP could not only directly quench the photocurrent of PTCA, but also acted as hydrogen peroxide (HRP) mimicking

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