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Fabrication of One Dimensional CNTs/Fe₃O₄@PPy/Pd Magnetic Composites for the Accumulation and Electrochemical Detection of Triclosan

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ABSTRACT

In this paper, multifunctional nanotubes were prepared by directly combining iron oxide (Fe₃O₄) nanoparticle(NPs) decorated carbon nanotubes (CNTs), and palladium (Pd) NPs together with polypyrrole (PPy) in a facile way. Firstly, magnetic CNT composite (CNTs/Fe₃O₄) was synthesized by the high temperature decomposition process, then PPy could be easily immobilized on the magnetic CNTs. Furthermore, Pd NPs were accumulated on the surface of CNTs/Fe₃O₄@PPy to obtain one dimensional CNTs/Fe₃O₄@PPy/Pd composite. The composite extraordinary amplified the electrochemical response, providing a highly sensitive electrochemical platform for triclosan detection. This electrochemical sensors had the advantage of fast response, cheap instrument, low cost, simple operation, high sensitivity and real-time detection in situ condition. Moreover, the sensor exhibited a wide linear response range for triclosan (2.247×10^{-9} M to 2.752×10^{-7} M) with a detection limit of 1.417×10^{-9} M,

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