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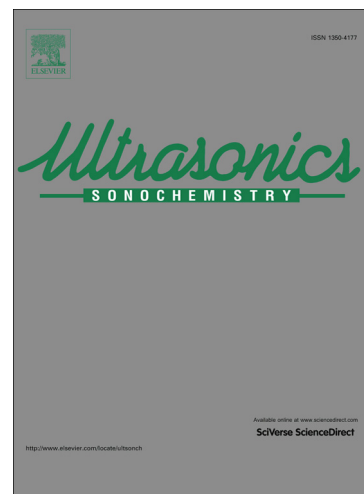
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A novel highly selective and sensitive detection of serotonin based on Ag/polypyrrole/Cu₂O nanocomposite modified glassy carbon electrode

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Abstract

A silver/polypyrrole/copper oxide (Ag/PPy/Cu₂O) ternary nanocomposite was prepared by sonochemical and oxidative polymerization simple way, in which Cu₂O was decorated with Ag nanoparticles, and covered by polypyrrole (PPy) layer. The as prepared materials was characterized by UV-vis-spectroscopy (UV-vis), FT-IR, X-ray diffraction (XRD), thermogravimetric analysis (TGA), scanning electron microscopy (SEM) with EDX, high resolution transmission electron microscopy (HR-TEM) and X-ray photoelectron spectroscopy (XPS). Sensing of serotonin (5HT) was evaluated electrocatalyst using polypyrrole/glassy carbon electrode (PPy/GCE), polypyrrole/copper oxide/glassy carbon electrode (PPy/Cu₂O/GCE) and silver/polypyrrole/copper oxide/glassy carbon electrode (Ag/PPy/Cu₂O/GCE). The Ag/PPy/Cu₂O/GCE was electrochemically treated in 0.1MPBS solution through cyclic voltammetry (CV) and differential pulse voltammetry (DPV). The peak current response increases linearly with 5-HT concentration from 0.01 to 250 $\mu\text{mol L}^{-1}$ and the detection limit was found to be 0.0124 $\mu\text{mol L}^{-1}$. It exhibits high electrocatalytic activity, satisfactory repeatability, stability, fast response and good selectivity against potentially interfering species, which suggests its potential in the development of sensitive, selective, easy-operation and low-cost serotonin sensor for practical routine analyses. The proposed method is potential to expand

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