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An Electrochemical Dopamine Sensor Based an a Cobalt(II) Coordination Polymer, $\{[Co(1,2\text{-}Bpe)_2(H_2O)_2]^{2+}\}_N$-Modified Electrode

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Dopamine (DA) is an important neurotransmitter for the function of the central nervous, renal, endocrine and cardiovascular systems. The development of a simple, selective and sensitive method to detect DA is necessary to monitor the level of DA in the human body. Many approaches have been developed for the detection of DA. The electrochemical analysis technique has received much attention as a reliable technique due to its simplicity and cost-effectiveness. Challenges to be overcome include the sensitivity and selectivity of modified electrodes for electrochemical detection of biological molecules in the presence of other interfering species. Various classes of materials have been used to construct electrochemical sensors, of which electrodes modified with porous coordination polymers have undergone explosive development. Cobalt-based coordination polymers are a promising electrochemical sensing material due to the superior electrocatalytic properties and variable valence of Co.

In this study, the electrochemical performance of the cobalt(II) coordination polymer, $\{[Co(1,2\text{-}bpe)_2(H_2O)_2]^{2+}\}_n$-modified glassy carbon (GC) electrode was analysed for the detection of DA using voltammetry techniques. It was shown that $\{[Co(1,2\text{-}bpe)_2(H_2O)_2]^{2+}\}_n$-modified GC electrode can be successfully used for the detection of dopamine.

Keywords: dopamine, cobalt(II) coordination polymer, modified glassy carbon electrode, electrochemical sensor