

High sensitive label-free electrochemical sensor using polydopamine-coated Zr-MOF composites for rapid detection of amoxicillin

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In recent years, with the misuse and uncontrolled release of antibiotics, the detection of antibiotics has become an important area of research in analytical chemistry. This work utilizes the self-polymerization property of dopamine in alkaline solution to synthesize polydopamine-coated Zr-MOF composites (Zr-MOF-PDA) using zirconium-based metal-organic framework (Zr-MOF) of ligand 4-carboxyphenylporphyrin as the carrier material. The electrochemical sensor for highly sensitive detection of amoxicillin (AMO) was successfully constructed by drop coating this compliant material on the surface of glassy carbon electrode. The AMO was detected by differential pulse voltammetry under the optimized experimental conditions. The linearity range was 0.25~90 μM , and the detection limit was 71 nM. The sensor was successfully used to determine AMO in river water and tap water samples with good recovery. The proposed sensor provides a feasible solution for the sensitive detection of AMO.

Keywords: Metal organic framework; Polydopamine; Amoxicillin; Electrochemical sensor; Label-free

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