Electrospinning Synthesis of Ag Nanoparticles-doped Carbon Nanofibers for Voltammetric Determination of H₂O₂

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Hydrogen peroxide (H₂O₂) has been widely used in various industries, including food production, pollution control, and textile bleaching. Therefore, it is necessary to determine its content for the sake of environmental and food safety. Silver nanoparticles (AgNPs) doped carbon nanofibers (CNFs) were prepared using electrospinning followed by calcination under a N₂ atmosphere as a novel electrocatalyst for the sensitive detection of H₂O₂. The composition, structure, and morphology of CNFs doped with AgNPs (AgCNFs) were characterized using Raman spectroscopy, X-ray diffraction, and scanning electron microscopy. The electrocatalytic activity of AgCNFs towards H₂O₂ reduction was evaluated using cyclic voltammetry and amperometry. As determined by electrochemical studies, the developed electrochemical sensor displayed a broad dynamic range of 0.01–50 mM and a detection limit of 3 μM (*S/N* = 3).

Keywords: Electrospun; Ag nanoparticles doped carbon nanofibers; H₂O₂; voltammetry.

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