Facile One-Step Electrochemical Deposition of Polypyrrole-Copper Nanoparticles for Detection of Hydrogen Peroxide

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Abstract

A straightforward and novel one-step technique for electrochemical synthesis of polypyrrole micro trunk-like shape decorated with copper nanoparticle is presented. The technique is based on electropolymerization and copper electrodeposition in the one-pot aqueous solution. The electrodeposited copper nanoparticles with 30 nm in diameter have embedded on the polypyrrole micro trunk-like. The synthesized electrode was characterized by field emission scanning electron microscopy, X-ray photoelectron spectroscopy and electrochemical methods. The chemical structures, morphology, catalytic and electrochemical properties of the synthesized sensor towards hydrogen peroxide were examined. The prepared sensor increased electrocatalytic activity toward reduction of hydrogen peroxide and can be employed as an inexpensive and novel sensor for determination of hydrogen peroxide.

Keywords: Chemistry, Polymers, Electrochemistry.

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