Facile and Rapid Synthesis of Microwave Assisted Pd Nanoparticles as Non-Enzymatic Hydrogen Peroxide Sensor

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Carbon supported Pd catalyst was prepared with microwave-assisted polyol method (M-Pd@C) and investigated sensing activity for non-enzymatic hydrogen peroxide (H_2O_2). Moreover, M-Pd@C and Pd@C catalyst which synthesized via polyol method (P-Pd@C) were compared to each other in terms of electrocatalytic activity. X-ray diffraction (XRD), X-ray photo electron spectroscopy (XPS), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) were used to investigate structural and morphological properties of these catalysts. Furthermore, electrochemical measurements were performed via cyclic voltammetry (CV), chronoamperometry (CA) techniques. CV results exhibited that M-Pd/C catalyst showed perfect electrocatalytic activity in terms of reduction of H_2O_2. M-Pd/C catalyst showed a fast response of less than 7 s with a linear range of 5.0×10^{-3}-11.0 mM and a relatively low detection limit of 1.2 μM amperometric response. M-Pd/C catalyst exhibited great selectivity for detecting H_2O_2 in the existence of several hindering species such as uric acid and ascorbic acid.

FULL TEXT