Surface Wettability-Enhanced Electrochemical Detection of Hydrogen Peroxide

Xiaoxia Su, Xiaomei Dong, Huile Jin^{*}, Tianqi Zhu, Chengzhan Yan, Aili Liu, Shun Wang^{*}

College of Chemistry and Materials Engineering, Wenzhou University, Wenzhou 325035, P. R. China

^{*}E-mail: huilejin@wzu.edu.cn; shunwang@wzu.edu.cn;

doi: 10.20964/2017.05.75

Received: 8 February 2017 / Accepted: 13 March 2017 / Published: 12 April 2017

A sensitive electrochemical sensor for the detection of hydrogen peroxide was fabricated in this study through manifesting surface wettability and morphology. Electrochemical measurements illustrate that a hydrophilic surface led to stronger electrocatalytic response of Pt to H₂O₂, yielding a sensitivity of 122.6 $\mu\text{A}\cdot\text{mM}^{-1}\cdot\text{cm}^{-2}$ within the concentration range between 40 and 500 nM. The achieved low detection limit is 12.8 nM. The hydrophilic surface also exhibits positive influences on the selectivity of H₂O₂ over ascorbic acid and ethanol. The observation highlights the importance of macroscopic properties such as surface wettability in the development of sensitive and selective chemical sensors.

Keywords: Surface wettability, Electrochemical catalysis, Hydrogen peroxide, Pt nanoparticle.

[FULL TEXT](#)

© 2017 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).