

Accepted Manuscript

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PII: S0167-577X(18)31429-0
DOI: <https://doi.org/10.1016/j.matlet.2018.09.054>
Reference: MLBLUE 24922

To appear in: *Materials Letters*

Received Date: 23 April 2018
Revised Date: 7 September 2018
Accepted Date: 10 September 2018

Please cite this article as: F. Sun, Z. Wang, Highly-branched dendrite cuprous oxide films for non-enzymatic amperometric glucose sensor, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.09.054>

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Abstract: Cuprous oxide (Cu₂O) thin films with highly-branched dendrite structures were synthesized by electroplating through a simple stirring condition. And, the improved performance of glucose oxidation was achieved on the dendrite Cu₂O film electrode. For the amperometric glucose detection, a favorable performance with a high sensitivity of 1470.8467 $\mu\text{A mM}^{-1} \text{cm}^{-2}$ and a low operating potential of 0.50 V were achieved. Thus, it would be a promising candidate electrode material for the development of non-enzymatic glucose sensors.

Keywords: thin films; dendrite structures; sensors

1. Introduction

Because the glucose detection is vital for food analysis, environmental monitoring, and medical diagnosis [1-2], the development of glucose sensors has become necessary. Among the existing detection methods, amperometric glucose biosensor is one promising method. Most studies involved the use of the glucose oxidase (GOD_x) due to its high sensitivity and good selectivity [3]. However, such enzyme-based sensors often suffer from the stability problem. Moreover, the immobilization of GOD_x on the electrode surfaces is a complicated procedure. Thus, non-enzyme glucose sensors through direct electrocatalytic oxidation of glucose have been developed.

In this regard, multiple efforts have been made to utilize metal and metal oxide [4-5]. Among them, Cu₂O has gained attention due to its low cost, proper redox potential and good electrochemical activity

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