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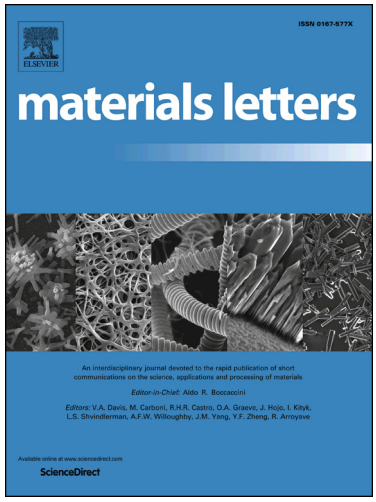

Highly-branched dendrite cuprous oxide films for non-enzymatic amperometric glucose sensor

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Highly-branched dendrite cuprous oxide films for non-enzymatic amperometric glucose sensor

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Abstract: Cuprous oxide (Cu_2O) 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 Cu_2O film electrode. For the amperometric glucose detection, a favorable performance with a high sensitivity of 1470.8467 μA mM^{-1} 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 (GODx) due to its high sensitivity and good selectivity [3]. However, such enzyme-based sensors often suffer from the stability problem. Moreover, the immobilization of GODx 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, Cu_2O has gained attention due to its low cost, proper redox potential and good electrochemical activity