

Accepted Manuscript

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PII: S0925-8388(18)31906-6

DOI: [10.1016/j.jallcom.2018.05.193](https://doi.org/10.1016/j.jallcom.2018.05.193)

Reference: JALCOM 46169

To appear in: *Journal of Alloys and Compounds*

Received Date: 19 November 2017

Revised Date: 12 May 2018

Accepted Date: 17 May 2018

Please cite this article as: C. Dong, Y. Tao, Q. Chang, Q. Liu, H. Guan, G. Chen, Y. Wang, Direct growth of MnCO_3 on Ni foil for a highly sensitive nonenzymatic glucose sensor, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2018.05.193.

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Direct growth of MnCO_3 on Ni foil for a highly sensitive nonenzymatic glucose sensor

Chengjun Dong,^{a,b} You Tao,^a Qing Chang,^a Quanhui Liu,^a Hongtao Guan,^{a,b} Gang
Chen,^{a,b} Yude Wang^{a,b,*}

*a School of Materials Science and Engineering, Yunnan University, 650091 Kunming,
People's Republic of China.*

*b Yunnan Province Key Lab of Micro-Nano Materials and Technology, Yunnan
University, Kunming 650091, PR China*

Abstract

Here, a novel MnCO_3 directly grown on Ni foil for sensitive nonenzymatic glucose detection has been fabricated by a facile hydrothermal approach. The morphologies and structures were characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray diffraction (XRD). These results show that the MnCO_3 initially compacted together in particles and then formed random rods due to the mismatch between MnCO_3 and substrate. The electrochemical performance of the MnCO_3/Ni foil for glucose detection was investigated by cyclic voltammetry (CV) and chronoamperometry, which demonstrates a high sensitivity of $1254.4 \mu\text{A mM}^{-1} \text{cm}^{-2}$ with a detection limit of $1 \mu\text{M}$ at 0.55 V , and a fast response time of 10 s . Moreover, the MnCO_3/Ni foil electrode exhibits excellent selectivity from interfering species such as KCl , NaCl , Ascorbic acid (AA), Uric acid (UA) and Dopamine (DA). Thus, the MnCO_3 would be a promising material in nonenzymatic glucose detection.

* To whom correspondence should be addressed. Tel:+86-871-65035570; Fax: +86-871-65035376.

E-mail: ydwang@ynu.edu.cn (Y. D. Wang)

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