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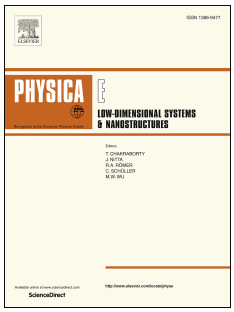

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PII: S1386-9477(18)30713-6

DOI: 10.1016/j.physe.2018.07.041

Reference: PHYSE 13244

To appear in: *Physica E: Low-dimensional Systems and Nanostructures*

Received Date: 14 May 2018

Revised Date: 30 July 2018

Accepted Date: 31 July 2018

Please cite this article as: H. Jiang, L. Li, S. Feng, W. Lu, Nanodiamond enhanced ZnO nanowire based UV photodetector with a high photoresponse performance, *Physica E: Low-dimensional Systems and Nanostructures* (2018), doi: 10.1016/j.physe.2018.07.041.

Nanodiamond Enhanced ZnO Nanowire Based UV Photodetector with a High Photoresponse Performance

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Abstract In this work, a nanodiamond enhanced ZnO nanowire based UV photodetector was fabricated via an inexpensive spin-coating method, which exhibits a high photocurrent responsibility of 0.59A/W and a high photocurrent intensity of 819.75μA/cm^2. Meanwhile, the reason of outstanding responsibility was systemically investigated by adjusting the interim morphologies and interface of synthesized nanodiamond/ZnO. This work represents a simple and efficient route to fabricate the larger scale UV photodetector with a high photoresponse performance.

Keywords: ZnO Nanowires；Nanodiamond；Photoresponse；Ultraviolet Photodetector

1. Introduction

UV photodetector presents a key role in the prevent of erythema, DNA damage, apoptotic cell death, skin pigmentation, skin cancer, radiation warning, flame detection, and missile tracking, etc.[1–3]A large variety of sensitive materials, such as ZnO,[4] SnO_2,[5] TiO_2,[6] Nb_2O_5[7] etc., have been used in UV photodetector. Among of them, ZnO as an environment-friendly broad band gap semiconductor has been paid much more attention on the construction of metal-semiconductor-metal type UV photodetector due to its high photoconductive characteristics, easy fabrication, significant on/off switching, large surface-to-volume ratio and low cost, etc.[8-15] However, ZnO nanowires based UV photodetector, its large surface-to-volume ratio allows great amount of oxygen molecules to be adsorbed onto the surface of ZnO to form low-conductivity