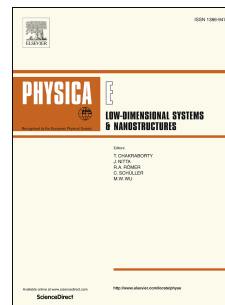


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Nanodiamond Enhanced ZnO Nanowire Based UV Photodetector with a High Photoresponse Performance

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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 819.75 μ A/cm². 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 SnO₂,⁵ TiO₂,⁶ Nb₂O₅⁷ 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

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