

Accepted Manuscript

Temperature-dependent photoluminescence analysis of ZnO nanowire array annealed in air

Yanan Sun, Xiuquan Gu, Yulong Zhao, Linmeng Wang, Yinghuai Qiang

PII: S0749-6036(18)30361-6

DOI: [10.1016/j.spmi.2018.03.083](https://doi.org/10.1016/j.spmi.2018.03.083)

Reference: YSPMI 5613

To appear in: *Superlattices and Microstructures*

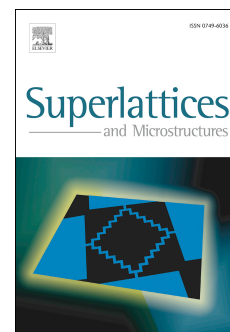
Received Date: 21 February 2018

Revised Date: 30 March 2018

Accepted Date: 30 March 2018

Please cite this article as: Y. Sun, X. Gu, Y. Zhao, L. Wang, Y. Qiang, Temperature-dependent photoluminescence analysis of ZnO nanowire array annealed in air, *Superlattices and Microstructures* (2018), doi: 10.1016/j.spmi.2018.03.083.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Temperature-dependent photoluminescence analysis of ZnO nanowire array annealed in air

Yanan Sun, Xiuquan Gu^{*}, Yulong Zhao, Linmeng Wang, and Yinghuai Qiang

School of Materials Science and Engineering, China University of Mining and Technology,

Xuzhou, China, 221116

^{*} To whom correspondence should be addressed:

^{a)} Xiuquan Gu

School of Materials Science and Engineering

China University of Mining and Technology

E-mail: xqgu@cumt.edu.cn

Abstract: ZnO nanowire arrays (NWAs) were prepared on transparent conducting fluorine doped tin oxide (FTO) substrates through a facile hydrothermal method, followed by a 500 °C annealing to improve their crystalline qualities and photoelectrochemical (PEC) activities. It was found that the annealing didn't change the morphology, but resulted in a significant reduction of the donor concentration. Temperature-dependent photoluminescence (PL) was carried out for a comprehensive analysis of the effect from annealing. Noteworthy, four dominant peaks were identified from the 10 K spectrum of a 500 °C annealed sample, and they were assigned to FX, D⁰X, (e, D⁰) and (e, D⁰) -1LO, respectively. Of them, the FX emission was only existed below 130 K, while the room-temperature (RT) PL spectrum was dominated by the D⁰X emission.

Key words: ZnO; photoluminescence; nanowire; array; exciton; annealing

Download English Version:

<https://daneshyari.com/en/article/7939025>

Download Persian Version:

<https://daneshyari.com/article/7939025>

[Daneshyari.com](https://daneshyari.com)