

Accepted Manuscript

Enhanced diode performance in cadmium telluride–silicon nanowire hetero-structures

Funda Aksoy Akgul, Guvenc Akgul, Hasan Huseyin Gullu, Husnu Emrah Unalan, Rasit Turan

PII: S0925-8388(15)01233-5

DOI: <http://dx.doi.org/10.1016/j.jallcom.2015.04.195>

Reference: JALCOM 34078

To appear in: *Journal of Alloys and Compounds*

Received Date: 10 June 2014

Revised Date: 16 April 2015

Accepted Date: 28 April 2015

Please cite this article as: F.A. Akgul, G. Akgul, H.H. Gullu, H.E. Unalan, R. Turan, Enhanced diode performance in cadmium telluride–silicon nanowire heterostructures, *Journal of Alloys and Compounds* (2015), doi: <http://dx.doi.org/10.1016/j.jallcom.2015.04.195>

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.



Enhanced diode performance in cadmium telluride–silicon nanowire heterostructures

Funda Aksoy Akgul^{1,5*}, Guvenc Akgul^{2,5*}, Hasan Huseyin Gullu^{3,5},
Husnu Emrah Unalan^{4,5}, Rasit Turan^{3,5}

¹*Department of Physics, Nigde University, 51240, Nigde, Turkey*

²*Bor Vocational School, Nigde University, 51700, Nigde, Turkey*

³*Department of Physics, Middle East Technical University, 06800, Ankara, Turkey*

⁴*Department of Metallurgical and Materials Engineering, Middle East Technical University, 06800 Ankara, Turkey*

⁵*Center for Solar Energy Research and Applications, Middle East Technical University, 06800, Ankara, Turkey*

Abstract

We report on the structural and optoelectronic characteristics and photodetection properties of cadmium telluride (CdTe) thin film/silicon (Si) nanowire heterojunction diodes. A simple and cost-effective metal-assisted etching (MAE) method is applied to fabricate vertically oriented Si nanowires on n-type single crystalline Si wafer. Following the nanowire synthesis, CdTe thin films are directly deposited onto the Si nanowire arrays through RF magnetron sputtering. A comparative study of X-ray diffraction (XRD) and Raman spectroscopy shows the improved crystallinity of the CdTe thin films deposited onto the Si nanowires. The fabricated nanowire based heterojunction devices exhibit remarkable diode characteristics, enhanced optoelectronic properties and photosensitivity in comparison to the planar reference device. The electrical measurements revealed that the diodes have a well-

Download English Version:

<https://daneshyari.com/en/article/7998279>

Download Persian Version:

<https://daneshyari.com/article/7998279>

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