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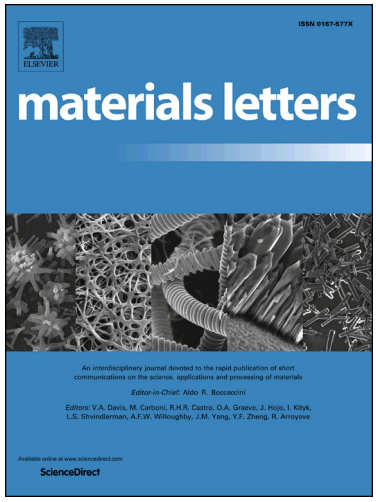

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PII: S0167-577X(18)31060-7
DOI: https://doi.org/10.1016/j.matlet.2018.07.029
Reference: MLBLUE 24595

To appear in: *Materials Letters*

Received Date: 5 July 2018
Accepted Date: 7 July 2018

Please cite this article as: H. Siddiqui, M. Shrivastava, M.R. Parra, P. Pandey, S. Ayaz, M.S. Qureshi, The effect of La^{3+} ion doping on the crystallographic, optical and electronic properties of CuO nanorods, *Materials Letters* (2018), doi: https://doi.org/10.1016/j.matlet.2018.07.029

The effect of La^{3+} ion doping on the crystallographic, optical and electronic properties of CuO nanorods

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Abstract

We have synthesized one-dimensional (1D) $Cu_{100-x}La_xO$ nanorods (NRs) by Co-precipitation method. The crystallographic phase, and morphology are analyzed using XRD, micro-Raman, XPS and TEM. The length and diameter of the $Cu_{100-x}La_xO$ NRs (x=0.0, 0.5, 1.0) are ~250-300 and 22-25nm. The effect of La^{3+} ion doping on the optical properties have been analyzed using diffused reflectance spectroscopy. The strategy of utilizing La^{3+} ion as dopant for CuO worked out positively, as evidenced by impedance spectroscopy study. Our work provides valuable insights into the design and utilization of 1D $Cu_{100-x}La_xO$ NRs for practical application in optoelectronics.

Keywords: Co-precipitation; Structural; Spectroscopy; Grain boundaries.

1. Introduction

Recently, the fabrication of one-dimensional (1D) CuO nanorods (NRs) has received extensive attention and huge potential have been predicted in wide-range of applications such as solar cell, gas sensor, photocatalysis etc [1]. But the poor hole mobility and electrical conduction of CuO NRs limits its applications for the same [2,3]. However, the large-scale synthesis of CuO NRs is hard to achieve by some of reported methods [4]. Moreover, electrical properties can remarkably