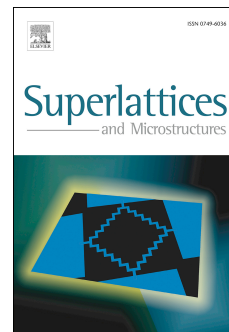


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Structural and properties transformation in ZnO hexagonal nanorod by ruthenium doping and its effect on DSSCs power conversion efficiency

Iwantono Iwantono¹, Rischi Yuda¹, Siti Khatijah Md Saad², Mohd Yusri Abd Rahman² and Akrajas Ali Umar^{2*}.

¹Department of Physics, Faculty of Mathematics and Science, Universitas Riau, Kampus Bina Widya, Panam, Pekanbaru, Indonesia.

²Institute of Microengineering and Nanoelectronics, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia.

Corresponding author, Email: akrajas@ukm.edu.my, Tel: +603 8911 8547, Fax.: +603 8925 0439.

Abstract

The addition of metal dopant into ZnO nanocrystals may induce changes both electronic and crystal grow properties, which later modify its photoactivity and surface physico-chemistry properties, improving its photovoltaic performance in DSSCs application. Here we report a dramatic distortion in the crystal grow orientation of ZnO in the presence of ruthenium ion dopant, changing the crystal morphology from fine hexagonal shape nanorod to starfruit-like shape nanorod. We found that such modification in the ZnO nanostructure enhanced photovoltaic properties, in typical case increased up to two times increment to 0.43%, compared to pristine hexagonal nanorod sample (0.2%). The present results may provide alternative strategy to augment the photoactivity of the nanostructure. High performance DSSC device will then be obtained when optimized fabrication procedure is implemented.

Keywords: Photovoltaic; Ru ion doping; DSSCs; ZnO nanorods; starfruit-like nanorods.

1. Introduction

Distortion in the structure[1-3] of ZnO nanostructures may modifies its physico-chemical properties[4], which later results in the enhancement of its photoactivity. ZnO hexagonal nanorods have been the subject of research focus since last one decades due to its unique structural growth and simplicity of the preparation process that realizes a highly-oriented

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