Accepted Manuscript

Effects of annealing temperature of spin-coated ZnO seed-layer on UV photo-sensing properties of PLD grown ZnO: Mg thin films

P.S. Shewale, S.H. Lee, Y.S. Yu

PII: S0925-8388(18)33546-1

DOI: 10.1016/j.jallcom.2018.09.294

Reference: JALCOM 47713

To appear in: *Journal of Alloys and Compounds*

Received Date: 21 August 2018

Revised Date: 22 September 2018

Accepted Date: 24 September 2018

Please cite this article as: P.S. Shewale, S.H. Lee, Y.S. Yu, Effects of annealing temperature of spin-coated ZnO seed-layer on UV photo-sensing properties of PLD grown ZnO: Mg thin films, *Journal of Alloys and Compounds* (2018), doi: https://doi.org/10.1016/j.jallcom.2018.09.294.

Effects of annealing temperature of spin-coated ZnO seed-layer on UV photo-sensing properties of PLD grown ZnO: Mg thin films

P. S. Shewale [a], S. H. Lee [a], Y. S. Yu [a, b]*

[a] Convergence of IT Devices Institute, Dong-Eui University, Busan 47340, South Korea

[b] Department of Radiological Science, Dong-Eui University, Busan 47340, South Korea

* Corresponding Author:

Email address: ysyu@deu.ac.kr (Y. S. Yu)

Tel.: +82-51-590-2760/+82-10-3846-9295 Fax: +82-51-890-2767

Abstract

Here, we have synthesized nanostructured wurtzite ZnO: Mg thin films by pulsed laser deposition on sol-gel spin coated ZnO seed layers which are annealed at 325^{o}C, 400^{o}C, and 475^{o}C. The influence of seed layer annealing process temperature on its growth and hence the structural, surface morphological and UV photodetection properties of the ZnO: Mg nanostructured thin film were investigated and described for the first time. All the ZnO: Mg films and seed layers exhibit the hexagonal wurtzite phase with a preferred (0 0 2) orientation and the optimal crystallization of the ZnO: Mg film takes place when it is deposited on seed layer annealed at 400^{o}C. The FESEM studies revealed a modification of the film surface morphology from dense ridge link to petal-like surface structures as a result of the changes in nanofibrous structures of beneath seed layer caused by annealing temperature variation. AFM revealed that the film growth is greatly influenced by the seed layer annealing temperature while confirming the highest grain size for the film deposited on seed layer annealed at 400^{o}C. Finally, we tested ZnO: Mg films for their photoconductive UV detection performance in metal–semiconductor–metal (MSM) formation, and are found to be