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

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**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°C, 400°C, and 475°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°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°C. Finally, we tested ZnO: Mg films for their photoconductive UV detection performance in metal–semiconductor–metal (MSM) formation, and are found to be

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