

Post Growth Annealing Effect on Deep Level Emission and Raman Spectra of Hydrothermally Grown ZnO Nanorods Assisted by KMnO₄

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Abstract : Zinc oxide, with its interesting properties such as large band gap (3.37eV), high exciton binding energy (60 meV) and intense UV absorption has been studied in literature for various applications viz. optoelectronics, biosensors, UV-photodetectors etc. The performance of ZnO devices is highly influenced by morphologies, size, crystallinity of the ZnO active layer and processing conditions. Recently, our group has shown the influence of the in situ addition of KMnO₄ in the precursor solution during the hydrothermal growth of ZnO nanorods (NRs) on their near band edge (NBE) emission. In this paper, we have investigated the effect of post-growth annealing on the variations in NBE and deep level (DL) emissions of as grown ZnO nanorods. These observed results have been explained on the basis of X-ray Diffraction (XRD) and Raman spectroscopic analysis, which clearly show that improved crystallinity and quantum confinement in ZnO nanorods.

Keywords : ZnO, nanorods, hydrothermal, KMnO₄

Conference Title : ICN 2016 : International Conference on Nanotechnology

Conference Location : Singapore, Singapore

Conference Dates : March 03-04, 2016