TF-P032

Optical and Structural Properties of ZnO Thin Films with Annealed ZnO Buffer Layers Grown by Plasma-Assisted Molecular Beam Epitaxy

Ghun Sik Kim[1], Min Su Kim[1], Do Yeob Kim[1], Su Min Jeon[1], Min Young Cho[1], Hyun Young Choi[1], Dong Kyun Jeong[1], Young Jin Kim[1], Jong Su Kim[2], Jeong-Sik Son[3], Sung Dong Park[4], Eundo Kim[4], Myong Hyo Jung[4], Do-Weon Hwang[4], Jae-Young Leem[1]*

[1]Department of Nano Systems Engineering, Inje University

[2]Department of Physics, Yeungnam University

[3]Department of Visual Optics, Kyungwoon University

[4]R&D Center, ALPHAPLUS Co., Ltd.

ZnO epilayers with thermal annealed ZnO buffer layers were deposited on p-type Si (100) by plasma-assisted molecular beam epitaxy (PA-MBE). The ZnO buffer layers prior to the growth of the ZnO epilayers were deposited on the Si substrates for 20 minutes and then annealed at the different substrate temperature (from 600 to 800 ^{o}C) in oxygen plasma. Room temperature (RT) photoluminescence (PL), X-ray diffraction (XRD), and scanning electron microscopy (SEM) were carried out in order to investigate the optical and structural properties of the ZnO epilayers with annealed ZnO buffer layer. The PL spectra show near-band edge emission (NBEE) at 3.3 eV and deep-level emission (DLE) around 1.9 to 2.2 eV. The full width at half maximum (FWHM) of the NBEE for the sample annealed at 600 ^{o}C is the lowest. The ZnO (002) peak intensity of the XRD spectra is relatively dominant. The PL spectra, the XRD spectra, the strain, and the surface morphology for the ZnO epitaxial layers are changed by the annealing process.