TF-P038

Influence of Interrupted ZnO Buffer Layer on Optical and Structural Properties of ZnO Thin Films Grown by Plasma-Assisted Molecular Beam Epitaxy

Min Young Cho[1], Byeong Guk Choi[1], Jae Min Lim[1], Su Min Jeon[1], Hyun Young Choi[1], Ghun Sik Kim[1], Do Yeob Kim[1], Min Su Kim[1], Jin Soo Kim[2], Joo In Lee[3], Sung Dong Park[4], Myong Hyo Jung[4], Jae-Young Leem[1]*

[1]Department of Nano Systems Engineering, Center for Nano Manufacturing, Inje University
[2]Division of Advanced Materials Engineering, Chonbuk National University
[3]Nanosurface Group, Korea Research Institute of Standards and Science
[4]ALPHAPLUS Co., Ltd.

ZnO thin films with growth interrupted ZnO buffer layers were grown by plasma-assisted molecular beam epitaxy (PA-MBE). The buffer layers were grown by two step growth. The first step of the ZnO buffer layers were grown without interrupt and the second step of the buffer layer growth was interrupted for 10 s, after the deposition of 18, 12, and 9 s. The cycle from deopsition to interruption were repeated for that were repeated 20, 30, and 40 times respectively, while the O2 plasma was kept constant during the growth. The structural and the optical properties of the ZnO thin films have been investigated by X-ray diffraction (XRD), scanning electron microscopy (SEM), and photoluminescence (PL). XRD spectra shows that all films had a strong (002) ZnO peak, indicating c-axis orientation. The full width at half maximum (FWHM) of the ZnO (002) diffraction peak and strain were decreased with increasing the interrupt times. The grain size was also affected by the growth condition. The PL spectra of all samples were consisted of near band edge emission (NBEE) and deep level emission (DLE). The relatively narrower peak of DLE caused by the different origin was observed as the interruption times changed.