

Abstract Submitted
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The electrical properties of epitaxial p-type ZnO films grown on GaAs (001) WEI-REIN LIU, Research Group, National Synchrotron Radiation Reserach Center, C.Y. LIN, B.H. LIN, S.T. HSU, Department of Photonics and Institute of Electro-Optical Engineering, National Chiao Tung University, F.S.-S. CHIEN, Department of Physics, Tunghai University, CHEN-SHIUNG CHANG, Department of Photonics and Institute of Electro-Optical Engineering, National Chiao Tung University, CHIA-HUNG HSU, Research Group, National Synchrotron Radiation Reserach Center, WEN-FENG HSIEH, Department of Photonics and Institute of Electro-Optical Engineering, National Chiao Tung University — Wurtzite ZnO epitaxial layers with both p-type and n-type characteristics are grown on n-type GaAs(001) substrates by pulsed laser deposition (PLD). The local electrical properties of the ZnO layers were investigated by electrostatic force microscope (EFM), Kevin force microscopy (KFM), and conducting atomic force microscopy (CAFM). Local work function difference of ~ 125.5 meV was observed on p-type ZnO layer from KFM and EFM measurements due to the un-uniform diffusion of As atoms from the GaAs substrate upon thermal annealing. We also found the work function of p-type ZnO is larger than that of n-type ZnO layer, in which the difference varied from 368.4 to 493 meV. The rectifying junction under p-ZnO/n-GaAs configuration and Ohmic contact under metal probe (Ti)/p-ZnO configuration were both observed by CAFM.

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