Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Characterizations of ZnO/Ga2O3 superlattices grown by atomic layer deposition. P.C. KUNG, Q.Y. CHEN, P.V. WADEKAR, W.C. HSIEH, C.F. CHANG, Department of Physics, National Sun Yat-Sen University, H.C. HUANG, Department of Material Science and Optoelectronics, National Sun Yat-Sen University, C.M. SHIAU, Y.P. CHENG, Y.S. HONG, C.Y. DANG, C.H. LEE, S.H. HUANG, Z.Y. WU, Y.Y. LIANG, C.M. LIN, S.T. YOU, L.W. TU, Department of Physics, National Sun Yat-Sen University, N.J. HO, Department of Material Science and Optoelectronics, National Sun Yat-Sen University, H.W. SEO, Department of Physics, Jeju National University, W.K. CHU, Texas Center of Superconductivity and Department of Physics, University of Houston — We have studied the structural and optical properties of ZnO/Ga2O3 superlattices (SLS) grown by ALD on (0001)-Al2O3, (100)- and (111)-Si substrates. Samples were grown followed the ratio of ALD cycles for ZnO (m) to Ga2O3 (n) was fixed at m:n = 2:3, while total thickness is the same for all. The structural properties used XRD and TEM indicate that samples are polycrystalline, while XRR confirmed the presence of SLS structures, albeit with rough interfaces suggesting that epitaxial growth in this system involves complex reaction kinetics. RTPL investigated relevant levels of energy transitions. For the thicker ZnO and Ga2O3 layers we observed a strong band emission peak at 3.36 eV, close to the bandgap of bulk value 3.37 eV. As the ZnO and Ga2O3 thicknesses were reduced, the band emission peak also reduced drastically. The causes behind the optical properties are further discussed in association with the first-principles calculations.

Q.Y. chen
Department of Physics, National Sun Yat-Sen University

Date submitted: 10 Nov 2016 Electronic form version 1.4