Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Gas cluster ion irradiation in formation of nano-ripple structures on silicon surfaces and its applications to producing III-nitride nanorods O. LOZANO, X.M. WANG, Q.Y. CHEN[1], J.R. LIU, P.V. CHINTA, P.V. WADEKAR, WEI-KAN CHU, Department of Physics and Texas Center for Superconductivity, University of Houston, Houston, TX., H.W. SEO, Department of Physics, University of Arkansas, Little Rock, AR, L.W. TU, Y.T. LIN, Y.L. CHENG, Department of Physics and Center for Nanoscience and Nanotechnology, National Sun Yat-Sen University, Kaohsiung, Taiwan, Republic of China — Gas cluster ion beams (GCIB) have been used to fabricate nano-ripple structures on Si substrates. In this work, using $(Ar)_n^+$ clusters at 30 kV acceleration, where n≈3,000, we have observed nano-ripple formations on the silicon surface after GCIB bombardment. The wavelength, amplitude and the dimensions of the ripples were studied in an effort to characterize the morphology as a function of angle of incidence, crystallographic orientations of the substrate, and the ion dosages. The underlying physics of ripple formation will be discussed and fabrication of nanorods on rippled (111)-Si substrates using III-nitrides, such as GaN, InGaN, and InAlN, will be presented.

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Date submitted: 21 Nov 2006 Electronic form version 1.4