Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Low temperature photoluminescence of single InP nanowires A. MISHRA, D. SHEREEN, THANG B. HOANG, L.V. TITOVA, H.E. JACKSON, L.M. SMITH, University of Cincinnati, J.M. YARRISON-RICE, Miami University, H.J. JOYCE, Y. KIM, Q. GAO, H.H. TAN, C. JAGADISH, Australian National University — We investigate low-temperature optical emission properties of a number of single InP nanowires prepared by catalyst-assisted vapor-liquid-solid growth. Photoluminescence (PL) spectra of the nanowires display a broad (full width at half maximum of 27 $\pm$ 3 meV) peak centered at 1.414 $\pm$ 0.008 eV, often accompanied by a broader lower energy shoulder at $\sim$ 1.378 $\pm$ 0.008 eV. The variability in energy of the main peak, which may correspond to bandgap emission, may be explained by structural and compositional variations and non-uniformities of the nanowires. The origin of the lower energy emission is not clear but is likely related to the defect states. We find the bandgap emission as well as excitation of InP nanowires to be strongly linearly polarized along the nanowire axis with a degree of polarization which varies significantly (45% - 85%) from wire to wire. We anticipate that polarization-sensitive single nanowire excitation spectroscopy will reveal information about spin dynamics in these nanostructures. Financial support for this work was provided by the University of Cincinnati and the Australian Research Council.

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Date submitted: 21 Nov 2006 Electronic form version 1.4