

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Insights into Optical Quality of GaAs/AlGaAs MOCVD Nanowires**<sup>1</sup> YI-HSIN CHIU, NICHOLAS G. MINUTILLO, GREG SMITH, Department of Physics, The Ohio State University, JOHN A. CARLIN, Institute for Materials Research, The Ohio State University, EZEKIEL JOHNSTON-HALPERIN, FENGYUAN YANG, Department of Physics, The Ohio State University — GaAs nanowires (NWs) are promising candidate materials for future optoelectronic device applications and fundamental physics study. In order to fully realize this potential it is important to identify a growth regime that yields high quality structural, electronic and optical characteristics. Here we explore the impact of growth temperature on NW optical quality for both (100) and (111)B oriented GaAs substrates. Au catalyzed GaAs/AlGaAs core/shell NWs are grown by metalorganic chemical vapor deposition (MOCVD) within a substrate temperature window of 410 °C to 470 °C. We find that, contrary to expectation, the optical quality depends on substrate orientation with (100) wire quality decreasing monotonically with increasing temperature while (111)B wire quality peaks at 430 °C. This result suggests that the orientation of the NW ensembles plays a critical role in precursor diffusion and subsequent point defect density.

<sup>1</sup>DOE (DE-SC0001304) and MRSEC (DMR-0820414)

Yi-Hsin Chiu  
Ohio State Univ - Columbus

Date submitted: 15 Nov 2013

Electronic form version 1.4