Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Influence of Indium Segregation on InGaN/GaN QD Band Alignment CHRISTIAN GREENHILL, ALEXANDER CHANG, JENNA WALRATH, T. FROST, P.K. BHATTACHARYA, RACHEL GOLDMAN, University of Michigan — InGaN/GaN QD systems are promising for optoelectronic devices, such as photovoltaics, light emitters, and lasers due to their high mobility, high absorption coefficient, and direct wide bandgap. However, indium segregation within InGaN quantum structures can lead to inefficiencies in device performance and has not been investigated in InGaN/GaN QD systems. Using scanning tunneling microscopy (STM) and scanning tunneling spectroscopy (STS), we have investigated the influence of indium nanostructure on the band structure of single or multi-layered InGaN/GaN QDs. We observe a mixture of indium mounds and QDs in the single layered InGaN/GaN QD system, where local STS measurements suggest a gradient in indium concentration across the indium mound. Furthermore, STM imaging suggests a higher density of InGaN/GaN QDs for multi-layered InGaN/GaN QDs compared to that of a single layered InGaN/GaN QDs, where STS measurements suggest indium clustering within InGaN QDs. We discuss the comparison of the band structure of InGaN/GaN mounds vs. QD systems.

Christian Greenhill
University of Michigan

Date submitted: 02 Dec 2015 Electronic form version 1.4