Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Effects of Light Exposure on Dopant Incorporation and Migration in MBE-Grown GaAs(001) CHARLOTTE E. SANDERS, D.A. BEATON, K. ALBERI, National Renewable Energy Laboratory — Light-stimulated epitaxy of II-VI semiconducting materials is known to reduce crystalline defect density and enhance substitutional dopant incorporation relative to traditional "dark" epitaxial growth. These effects have been speculated to arise from photon-adatom interactions at the growth front, and from involvement in bonding processes by photogenerated carriers; however, a conclusive explanation of the observed effects has yet to be found. We are revisiting this topic, attempting to clarify the mechanisms of light-stimulated epitaxy and to explore its effects on the class of III-V materials. Here we report an ongoing investigation into dopant incorporation and migration in MBE-grown GaAs(001) when the growth front is irradiated during deposition. On the basis of our preliminary findings, and by comparing our new results with results previously obtained for light-stimulated effects on doping of II-VI systems, we can begin to draw conclusions about the mechanisms underlying light-stimulated epitaxy and their potential utility to MBE growth of complex multilayer structures. This work was supported by the DOE Office of Science, Basic Energy Sciences, under contract DE-AC36-08G028308.

Charlotte E. Sanders
National Renewable Energy Laboratory

Date submitted: 14 Nov 2014 Electronic form version 1.4