Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Light-stimulated epitaxy of GaAs(100) CHARLOTTE E. SANDERS, DANIEL A. BEATON, KIRSTIN ALBERI, National Renewable Energy Laboratory, Golden, CO 80401 — Light-stimulated epitaxy offers the potential to improve adatom kinetics at low growth temperatures. In II-VI semiconductors it has been shown to improve crystalline quality (i.e., to reduce defect density), to alter the growth rate, and to enhance substitutional dopant incorporation. These effects have been attributed primarily to (1) direct interaction between photons and adatoms at the growth front, and (2) participation of photogenerated carriers in bonding processes. Although these proposed mechanisms are presumably applicable to a wide array of epitaxially grown materials systems, the photoassisted approach has received little attention outside the context of II-VI growth. We report on our recent investigation of the effects of irradiation of GaAs(100) during growth by molecular beam epitaxy (MBE). The interaction of light with the growth front provides significant insight into fundamental mechanisms of dopant incorporation, and into the physics of adatom diffusion, nucleation, and desorption underlying the MBE process. This work was supported by the DOE Office of Science, Basic Energy Sciences, under contract DE-AC36-08G028308.

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Date submitted: 14 Nov 2013 Electronic form version 1.4