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Effects of incident short wavelength (UV) light on the morphology of MBE grown GaAs DANIEL A. BEATON, CHARLOTTE SANDERS, KIRSTIN ALBERI, National Renewable Energy Lab — The exploration of novel semiconductor materials increasingly relies on growth techniques that operate far from equilibrium in order to overcome thermodynamic limitations to synthesis. As one example, low temperature molecular beam epitaxy (MBE) offers a pathway to enhance substitutional dopant incorporation over surface segregation but adatom mobility suffers as a consequence and leads to higher concentrations of lattice defects. We explore the use of external stimuli, namely incident UV light, as a means to influence adatom kinetics; UV light is absorbed in the first few atomic layers of the as-growing epitaxial film and the effects of the incident radiation predominantly effect only the surface adatoms. GaAs homoepitaxy by MBE is studied as a model case as a function of illumination conditions under broadband Xe and KrF excimer laser irradiation. In-situ reflective high energy electron diffraction analysis paired with ex-situ atomic force microscopy measurements yields insight into the effects of photon irradiation on surface adatom mobility, morphology and smoothing processes. This work was supported by the DOE Office of Science, Basic Energy Sciences under contract DE-AC36-08GO28308.

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