

Abstract Submitted
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Aluminum Nitride Grown by Atomic Layer Epitaxy Characterized with Real-Time Grazing Incidence Small Angle X-ray Scattering VIRGINIA ANDERSON, NEERAJ NEPAL, SCOOTER JOHNSON, US Naval Research Laboratory, ZACHARY ROBINSON, The College at Brockport, State University of New York, ALEXANDER DEMASI, Boston University, JENNIFER HITE, US Naval Research Laboratory, KARL LUDWIG, Boston University, CHARLES EDDY, US Naval Research Laboratory — Aluminum nitride, gallium nitride, and indium nitride are being considered for many applications, and are currently being used commercially for LEDs. These III-nitride films are conventionally deposited by metalorganic chemical vapor deposition and molecular beam epitaxy. Research into depositing III-nitrides with atomic layer epitaxy (ALE) is underway as it is a fabrication friendly technique for thin films at lower temperatures. AlN deposited with ALE at 500°C have been shown to have good crystallinity, but relatively high carbon and oxygen impurities, and understanding the film deposition mechanism is an ongoing project.¹ Grazing incidence small angle x-ray scattering (GISAXS) is sensitive to surface features, making it useful for real time monitoring of deposition processes. AlN was monitored by GISAXS while being deposited with ALE using trimethylaluminum and hydrogen/nitrogen plasma at the Brookhaven National Synchrotron Light Source and the Cornell High Energy Synchrotron Source. The GISAXS of AlN ALE at nominally 400°C, 450°C, and 500°C was compared to ex situ characterization with XPS and AFM.

¹N. Nepal et al., **Appl. Phys. Lett.** **103** 082110 (2013)

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