

Abstract Submitted  
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**Molten Salt Based Growth of GaN for Native Substrates** KAREN WALDRIP, Sandia National Laboratories, T. KERLEY, A. WEST, F. DELNICK, J. TSAO, D. INGERSOLL, SANDIA NATIONAL LABORATORIES TEAM — The issue of material quality in III-nitrides is nearly ubiquitous in the field owing to the lack of a lattice-matched substrate on which to epitaxially grow thin films for LEDs. Conventional approaches to growth of bulk gallium nitride material require overpressures ranging from 4,000 to 45,000 atmospheres, and the kinetics of such processes is slow and difficult to scale. This work will describe and demonstrate proof of the underlying concepts for a process that may be capable of growing large-area bulk gallium nitride at fast growth rates, reasonable temperatures (450-950C), and 1 atm. This method circumvents the typical challenges associated with growth of bulk nitride material by precipitating from a molten salt, which provides the perfect host environment for the reactive nitride anion. Furthermore, molten salts can also function as an electrolyte, permitting electrochemical pre-growth purification processes in addition to several possible methods to electrochemically enhance the growth process, providing further control over the quality of the precipitate. We have recently demonstrated molten salt-based growth of wurtzite GaN crystals as large as 0.9 mm long by 0.6 mm wide in as little as two hours using these techniques. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under contract DE-AC04-94AL85000.

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