

## Ammonothermal Bulk GaN Growth and Its Processing

Tadao Hashimoto\*, Edward Letts, Daryl Key,  
Keith Male, Matthew Michaels and Sierra Hoff

SixPoint Materials, Inc., 37, Industrial Way 106, Buellton, CA 93427, USA

(Received January 6, 2014; accepted May 7, 2014)

**Key words:** ammonothermal growth, bulk GaN, dislocation density, optical absorption, wafer processing

In this paper, we overview the current progress of ammonothermal GaN growth at SixPoint Materials, Inc. and discuss issues in wafer processing. Bulk GaN crystals grown in small prototype reactors present a high-quality microstructure as well as an improved transparency. The dislocation density of the crystal is on the order of  $4.0 \times 10^4 \text{ cm}^{-2}$ . The optical absorption coefficient as low as  $4 \text{ cm}^{-1}$  at 450 nm is obtained. Wafer processing techniques, such as wire sawing and chemical mechanical polishing, are one of the challenges in realizing GaN wafers. Crystal cracks are the major and fundamental obstacle in achieving a high-quality surface during wire sawing. The surface quality after chemical mechanical polishing (CMP) is successfully evaluated using X-ray diffraction.

\*Corresponding author: e-mail: [Tadao@spmaterials.com](mailto:Tadao@spmaterials.com)