

# Author's Accepted Manuscript

## High-Quality AlN Template Grown on a Patterned Si(111) Substrate

Binh Tinh Tran, Hideki Hirayama, Masafumi Jo,  
Noritoshi Maeda, Daishi Inoue, Tomoka Kikitsu



[www.elsevier.com/locate/jcrysgro](http://www.elsevier.com/locate/jcrysgro)

PII: S0022-0248(16)30970-8

DOI: <http://dx.doi.org/10.1016/j.jcrysgro.2016.12.100>

Reference: CRY23959

To appear in: *Journal of Crystal Growth*

Cite this article as: Binh Tinh Tran, Hideki Hirayama, Masafumi Jo, Noritoshi Maeda, Daishi Inoue and Tomoka Kikitsu, High-Quality AlN Template Grown on a Patterned Si(111) Substrate, *Journal of Crystal Growth* <http://dx.doi.org/10.1016/j.jcrysgro.2016.12.100>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

**High-Quality AlN Template Grown on a Patterned Si(111) Substrate**

Binh Tinh Tran<sup>1\*</sup>, Hideki Hirayama<sup>1</sup>, Masafumi Jo<sup>1</sup>, Noritoshi Maeda<sup>1</sup>, Daishi Inoue<sup>2</sup> and Tomoka Kikitsu<sup>2</sup>

<sup>1</sup>*Quantum Optodevice Laboratory, RIKEN, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan*

<sup>2</sup>*Materials Characterization Support Unit, Center for Emergent Matter Science, RIKEN, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan*

*\*Corresponding author: tinh.tran@riken.jp*

**Abstract:**

To obtain a high-quality AlN template on a Si substrate for high-quantum efficiency AlGaIn-based deep-UV LED applications, we fabricated a high-density micro-patterned Si(111) substrate. An about 8- $\mu\text{m}$ -thick AlN template was grown on the Si(111) substrate in a metal-organic chemical vapor deposition reactor by using  $\text{NH}_3$  pulsed-flow multilayer AlN growth and epitaxial lateral overgrowth methods. The template had a small X-ray full width at half-maximum with rocking curves of 620 and 1141 arcsec for the symmetric and asymmetric (002 and 102) planes. A threading dislocation density at the best region as low as  $10^7 \text{ cm}^{-2}$  was also obtained.

Keywords: MOCVD, AlN, Pattern, Si, LEDs.

**Introduction**

Download English Version:

<https://daneshyari.com/en/article/5489568>

Download Persian Version:

<https://daneshyari.com/article/5489568>

[Daneshyari.com](https://daneshyari.com)