

Abstract Submitted
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Influences of Repetition Rate of Laser Pulses on Growth of AlN Thin Films on Sapphire(0001) by Reactive Pulsed Laser Deposition TOMOHIRO YOSHIDA, Kyushu University, KAZUSHI SUMITANI, RYOTA OHTANI, Saga Light Source, SATOSHI MOHRI, TSUYOSHI YOSHITAKE, Kyushu University, KYUSHU UNIVERSITY TEAM, SAGA LIGHT SOURCE TEAM — Hexagonal AlN (α -AlN) is a promising material for applications. On the other hand, few studies have been reported on metastable cubic AlN (β -AlN). β -AlN is expected to possess higher ballistic electron velocities, thermal conductivity, and acoustic velocity than α -AlN due to its higher crystallographic symmetry. Pulsed laser deposition (PLD) is a quite simple and effective method for fabrication of compound films. Especially, a non-equilibrium condition in a PLD process is beneficial on the growth of metastable phases. In this study, AlN thin films were deposited in a nitrogen atmosphere by PLD using a sintered AlN target. The film preparations were made at different repetition rates of laser pulses from 10 to 50 Hz, and the influences of the repetition rate on the crystalline structure and morphology were investigated. Employment of high frequency laser pulses enhanced the crystalline growth and in addition it afforded the crystal growth at higher nitrogen pressures. Crystalline growth of α -AlN was strongly influenced by the repetition rate. Metastable β -AlN was grown at high repetition rates and high nitrogen pressures.

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