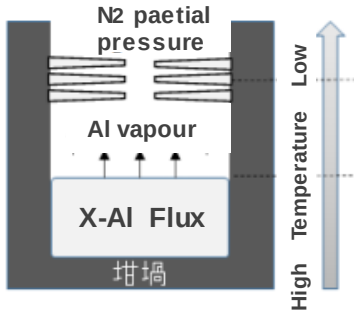
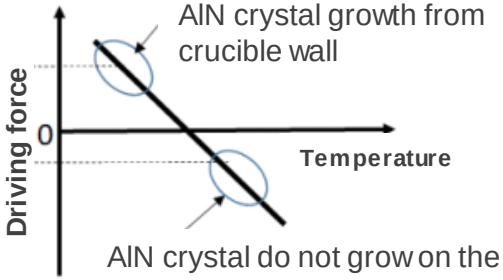
Tohoku Univ. Technology

Single-crystal aluminum nitride seed crystal

Able to create AlN seed crystal at low temperature, easy temperature control and fast growth rate





AlN crystal growth from crucible wall

AlN crystal do not grow on the flux surface

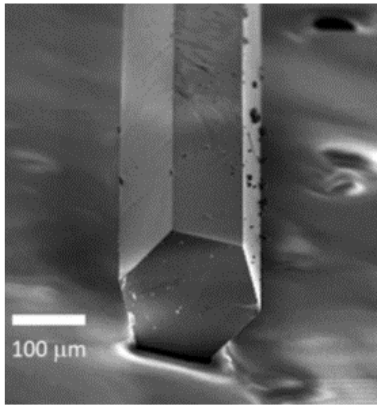
Overview

Deep ultraviolet light emitting device (DUV-LED) is fabricated from AlGaN-based nitride semiconductor. The substrate material for the AlGaN-based DUV-LED is required to have high lattice matching with AlGaN, wider band gap than AlGaN and high thermal conductivity. Aluminum nitride (AlN) is attracting attention since it satisfies those conditions.

The sublimation method is a conventional method for producing AlN single crystal, but the cost is high because of high temperature requirement, and temperature control is also difficult.

Using this technology, single-crystal AlN seed crystal can be created at a relatively high speed under low-temperature and easy temperature control conditions.

Possible to create highly oriented single-crystal AlN seed crystal



←Cross-sectional image of AlN seed crystal

Confirmation of extremely highly oriented single crystal from the pole figure

1 AlN seed crystal ↓

Product Application

- AlN crystal as AlGaN-based nitride semiconductor substrate
- In particular, the creation of seed crystal as a starting point for the growth of AlN on AlN substrate

Related Works

[1] AMEI Chiaki, TOKUCHI Yuki, ADACHI Masayoshi, OTSUKA Makoto, FUKUYAMA Hiroyuki, The Japan Institute of Metals and Materials 2022 Spring lecture conference, 77.

IP Data

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