

Growth and Evaluation of Bulk GaN Crystals Grown on a Point Seed Crystal by Ba-Added Na Flux Method

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We grew bulk gallium nitride (GaN) single crystals on a point seed by using the Ba-added Na flux method and evaluated their structural and optical properties. As a result, we successfully grew habit-controlled single GaN crystals. The size of the largest crystal in this study was 7 mm along the [0001] direction and 9 mm along the $\langle 11\text{-}20 \rangle$ direction after 200 h of growth. The cathodoluminescence (CL) images of (10-10) GaN wafers sliced from the grown crystal revealed that large areas of the wafer were dislocation free. Full widths at half maximum (FWHMs) of the X-ray rocking curve (XRC) of GaN (10-10) at low-dislocation-density sectors were from 32 to 61 arcsec. No green and yellow luminescence (GL and YL, respectively) peaks were detected from the room-temperature photoluminescence spectrum. From these results, it is found that the Ba-added Na flux method of GaN crystal growth on a point seed opens the possibility of fabricating high-quality prismatic GaN bulk single crystals.

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