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Progress on Growing High-Quality 4H-SiC Single Crystal by Top Seeded Solution Growth

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Abstract:

Silicon carbide (SiC) is a high performance substrate for power device, steadily replacing conventional semiconductor materials, Silicon (Si) and Gallium Arsenide (GaAs), due to its outstanding properties including high thermal conductivity, high breakdown voltage, and high saturated electron drift velocity. Top Seeded Solution Growth (TSSG) has been actively studied for growing high-quality crystals owing to growth condition close to the thermodynamic equilibrium. However, the TSSG is still not adopted as the commercial process to fabricate SiC wafers, but more research is needed.

In this study, we reveal our recent progress on growing high-quality thick 2-inch 4H-SiC single crystal bulks by TSSG. The obtained crystal were evaluated with the chemical and physical properties which were obtained by the Normaski optical microscope (OM), Raman spectroscopy, High Resolution X-ray Diffraction (HRXRD), and synchrotron white beam X-ray topography (SWBXRT).

Keywords

SiC, TSSG, Dislocation, XRT, High-quality

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