

High-temperature thermal expansion of ScAlMgO₄ for substrate application of GaN and ZnO epitaxial growth

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High-temperature powder X-ray diffraction measurements for ScAlMgO₄ grown by Czochralski method were carried out from 303 to 1473 K. The obtained temperature-dependent unit cell parameters indicates that the axial thermal expansion coefficients for the *a*-axis estimated from the unit cell parameters were comparable to those of GaN and ZnO suggesting that ScAlMgO₄ is one of the promising substrates for *c*-plane epitaxial growth of GaN and ZnO. High temperature X-ray single crystal structural analysis of ScAlMgO₄ demonstrated the mechanism of the nonlinear variation of the obtained cell parameters as a function of temperature.

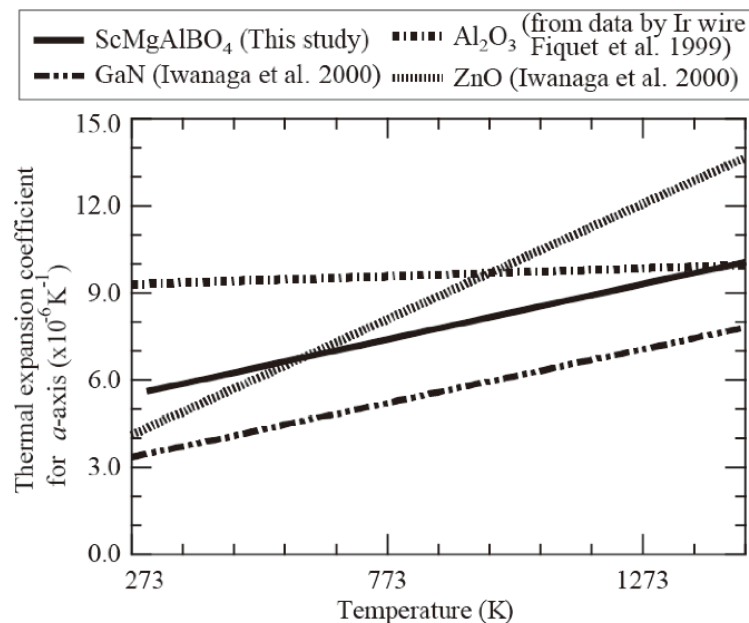


Fig.2 Temperature dependence of the *a*-axis for ScAlMgO₄ in comparison to those of GaN, ZnO, and Al₂O₃.

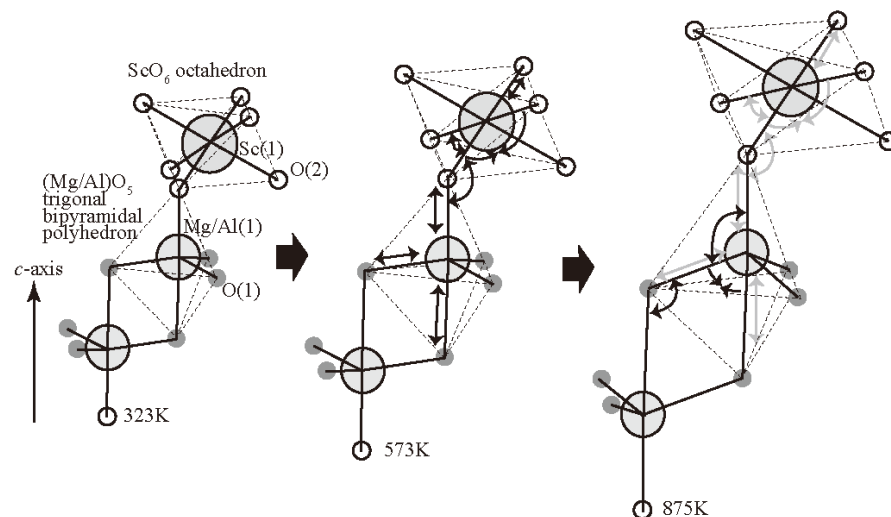


Fig.2 Schematic illustration of the thermal expansion of ScAlMgO₄ structure.