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PROCEEDINGS PAPER

### Calculations of the refractive index of AlGa<sub>x</sub>N/GaN quantum well

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Paper Abstract

We have calculated the refractive index of a Al<sub>x</sub>Ga<sub>1-x</sub>N/GaN square quantum well (QW). The imaginary part of the dielectric function has been obtained by summing up the contributions of the dominant interband transitions, excitonic contributions, and the continuum contribution, obtained by weighting the well's and the barrier's continuum contributions. In the calculation of the contribution of the conduction-valence band bound-state effect without electron-hole interaction, conduction bands are assumed to be parabolic and valence bands have been calculated using Chuang's model, but with Chan's basis expansion method instead of finite-difference scheme. Excitonic contribution has been described with an expression derived by the density-matrix approach at the subband edge without the influence of band mixing. The continuum contributions have been described with the modified Adachi's model. The effects of the aluminum model fraction x and the width of the well on the refractive index are analyzed and discussed.

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