



Article: Modeling the optical constants of wide bandgap materials

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Title Modeling the optical constants of wide bandgap materials

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Abstract Calculations of the optical constants of hexagonal GaN (in the range 1-10 eV), InN (in the range 2-20 eV), AlN (in the range 6-20 eV) and 6H-SiC (in the range 1-30 eV) for the component perpendicular to the c axis are presented. The employed model is modified [Adachi's](#) model of the optical properties of semiconductors. In the employed model, damping constant Γ describing broadening phenomenon is replaced with the frequency dependent expression $\Gamma(\omega)$. In such a manner, type of broadening represents adjustable parameter of the model, allowing broadening to vary over a range of functions with similar kernels but different wings. Excellent agreement with experimental data is obtained for all investigated materials. Obtained relative rms errors for the real and imaginary parts of the index of refraction are equal to 3.5% and 5.2% for 6H-SiC in the 1-30 eV range, 1.7% and 4.1% for GaN in the 1.5-10 eV range, 1.2% and 2.5% for InN in the 2-10 eV range and 1.5% and 1.9% for AlN in the 6-20 eV range.

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