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## Modeling the optical constants of $\text{Al}_x\text{Ga}_{1-x}\text{As}$ alloys

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The extension of Adachi's model with a Gaussian-like broadening function, in place of Lorentzian, is used to model the optical dielectric function of the alloy  $\text{Al}_x\text{Ga}_{1-x}\text{As}$ . Gaussian-like broadening is accomplished by replacing the damping constant in the Lorentzian line shape with a frequency dependent expression. In this way, the comparative simplicity of the analytic formulas of the model is preserved, while the accuracy becomes comparable to that of more intricate models, and/or models with significantly more parameters. The employed model accurately describes the optical dielectric function in the spectral range from 1.5 to 6.0 eV within the entire alloy composition range. The relative rms error obtained for the refractive index is below 2.2% for all compositions. © 1999 American Institute of Physics.

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### KEYWORDS and PACS

#### Keywords

aluminium compounds, gallium arsenide, III-V semiconductors, optical constants, dielectric function, refractive index, spectral line broadening

#### PACS

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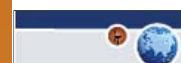
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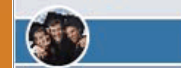
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