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Optical constants of InP and GaP

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ABSTRACT

Calculation of the optical constants of InP and GaP is presented. The employed model is a modification of Adachi's model of the optical constants of semiconductors, which employs adjustable broadening instead of the conventional Lorentzian one. In this work we do not take into account excitonic effects at E_1 and $E_1 + \Delta_1$ critical points. In such a manner, fewer adjustable model parameters are required and the term with dubious physical interpretation describing excitons at E_1 and $E_1 + \Delta_1$ is left out. We obtain excellent agreement with experimental data over the entire 1-6 eV range, with relative rms error for the refractive index equal 1.0% for InP and 1.2% for GaP

INDEX TERMS

• IEEE Terms

Dielectrics , Electrooptic effects , Excitons , Indium phosphide , Integrated optics , Optical refraction , Optical variables control , Photonic band gap , Refractive index , Solid modeling

• INSPEC

◦ Controlled Indexing

III-V semiconductors , excitons , gallium compounds , indium compounds , refractive index , spectral line broadening

◦ Non Controlled Indexing

1 to 6 eV , Adachi model , GaP , InP , adjustable broadening , adjustable model parameters , critical points , excitons , optical constants , refractive index , relative rms error , semiconductors

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