Optical constants of $Hg_xCd_{1-x}Te$ alloys

This paper appears in:
Microelectronics, 2000. Proceedings. 2000 22nd International Conference on
Date of Conference: 2000
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Volume: 1
Page(s): 243 - 246 vol.1
Product Type: Conference Publications

ABSTRACT

Optical constants of $Hg_xCd_{1-x}Te$ alloys are modeled for the first time over the spectral range from 1.5 eV to 6.0 for all compositions 0⩽x⩽1. The employed model is the modified Adachi's model, which utilizes variable broadening instead of the conventional Lorentzian one. The model takes into account transitions at critical poin E_0, $E_0+\Delta_0$, E_1, $E_1+\Delta_1$, E_0', $E_2(X)$, and $E_2(\Sigma)$, as well as excitonic effects at the lowest four critical points. Model parameters are determined using a global optimization routine, namely an acceptance-probability-controlled simulated annealing algorithm. Excellent agreement with the experimental data is obtained in the entire investigated energy and composition ranges

INDEX TERMS

- **IEEE Terms**
  Absorption , Dielectrics , Electrooptic effects , Gold alloys , Mercury (metals) , Optical refraction , Oscillators , Photor band gap , Spectroscopy , Tellurium

- **INSPEC**
  - **Controlled Indexing**
    II-VI semiconductors , cadmium compounds , dielectric function , excitons , mercury compounds , optical consta simulated annealing

  - **Non Controlled Indexing**
    HgCdTe , exciton , global optimization , modified Adachi's model , optical constants , simulated annealing , varia line broadening

Additional Details | References (9)

Meeting Date : 14 May 2000-17 May 2000
Conference Location : Nis
Print ISBN: 0-7803-5235-1
INSPEC Accession Number: 6635918
Digital Object Identifier : 10.1109/ICMEL.2000.840565