

## 文献

González-Cuevas, J.A.<sup>a</sup>, Refaat, T.F.<sup>b</sup>, Abedin, M.N.<sup>c</sup>, Elsayed-Ali, H.E.<sup>a</sup>

### Modeling of the temperature-dependent spectral response of In<sub>1-x</sub>Ga<sub>x</sub>Sb infrared photodetectors

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<sup>a</sup> Old Dominion University, Department of Electrical and Computer Engineering, Norfolk, VA 23529, United States

<sup>b</sup> NASA Langley Research Center, Science and Technology Corporation, Hampton, VA 23681, United States

<sup>c</sup> NASA Langley Research Center, Passive Sensor Systems Branch, Hampton, VA 23681, United States

#### 抄録 (Abstract)

A model of the spectral responsivity of In<sub>1-x</sub>Ga<sub>x</sub>Sb p-n junction infrared photodetectors is developed. This model is based on calculations of the photogenerated and diffusion currents in the device. Expressions for the carrier mobilities, absorption coefficient, and normal-incidence reflectivity as a function of temperature are derived from extensions made to Adachi and Caughey-Thomas models. Contributions from the Auger recombination mechanism, which increase with a rise in temperature, are also considered. The responsivity is evaluated for different doping levels, diffusion depths, operating temperatures, and photon energies. Parameters calculated from the model are compared with available experimental data, and good agreement is obtained. These theoretical calculations help us to better understand the electro-optical behavior of In<sub>1-x</sub>Ga<sub>x</sub>Sb photodetectors, and can be utilized for performance enhancement through optimization of the device structure. © 2006 Society of Photo-Optical Instrumentation Engineers.

#### 著者キーワード

Electrical properties; InGaSb; Optical properties; Photodetectors; Spectral response; Temperature effect

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