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Thermoelectric power and low-field electron mobility in $Al_xGa_{1-x}N$ lattice-matched to GaN

H. ARABSHAHI
Department of Physics, Ferdowsi University of Mashhad,
P.O. Box 91775-1436, Mashhad-IRAN
e-mail: arabshahi@um.ac.ir

Keywords
Authors

Abstract: The results of thermoelectric power and electron drift mobility in $Al_xGa_{1-x}N$ lattice-matched to GaN are calculated for different temperatures, free-electron concentrations and compositions. The two-mode nature of the polar optic phonons is considered jointly with deformation potential acoustic, piezoelectric, alloy and ionized-impurity scattering. Band non-parabolicity, admixture of p functions, arbitrary degeneracy of the electron distribution and the screening effects of free carriers on the scattering probabilities are incorporated. The Boltzmann equation is solved by an iterative technique using the currently established values of the material parameters. The iterative results are in fair agreement with other recent calculations obtained using the relaxation-time approximation and experimental methods.

Key Words: Thermoelectric power, optical phonon, piezoelectric, non-parabolicity, relaxation-time

phys@tubitak.gov.tr

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