Pioneer Journal of Computer Science and Engineering Technology
Volume 8, Issues 1&2, Pages 45-56 (September & December 2014)

ISSN: 2231-184X

COMPARISON OF LOW FIELD ELECTRON TRANSPORT IN ZINCBLENDE AND WURTZITE 6H-SiC STRUCTURES FOR HIGH GAIN DEVICE MODELING

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Received December 31, 2011; Revised December 21, 2013

Abstract

Temperature and doping dependencies of electron mobility in both wurtzite and zincblende 6H-SiC structures have been calculated using an iterative technique. The following scattering mechanisms, i.e., impurity, polar optical phonon, acoustic phonon, piezoelectric and electron plasmon are included in the calculation. Ionized impurity scattering has been treated beyond the Born approximation using the phase-shift analysis. It is found that the electron mobility decreases monotonically as the temperature increases from 100 K to 600 K. The low temperature value of electron mobility increases significantly with increasing doping concentration. The iterative results are in fair agreement with other recent calculations obtained using the relaxation-time approximation and experimental methods.

Keywords and phrases: wurtzite, zincblende, ionized impurity scattering.