

Abstract Submitted  
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**Electron phonon coupling and carrier lifetimes in III-nitride ternary semiconductors**<sup>1</sup> NANDAN TANDON, P.G. KASSEBAUM, L.R. RAMMOHAN, Physics Department, Worcester Polytechnic Institute, Worcester, MA, USA — III-nitride semiconductors have a large bandgap and find applications in high power devices, in which the thermal management of energy generated becomes a key issue. The transfer of energy from the energetic carriers to the lattice is determined by the electron-phonon coupling for the crystal. In this work, we present our results on the electron-phonon coupling in ternary and quaternary semiconductors. The full phonon dispersion and electron-phonon coupling is determined using ab-initio methods. We then evaluate the carrier lifetimes for the emission of LO phonons by including the full zone and not only the zone center phonons. We expect that the treatment of the electron-phonon coupling effects over the full Brillouin zone could be critical for III-nitride thermal management, and will be directly compared to the results where only the zone center phonons are considered.

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