

Abstract Submitted
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Electron scattering in bulk InN LEON HSU, University of Minnesota, WLADEK WALUKIEWICZ, Lawrence Berkeley National Laboratory — Recent improvements in the quality of single-crystal InN have made controlled doping studies possible. Irradiation by a variety of beams (electron, proton, He) can be used to produce n-type bulk crystals of InN with carrier concentrations ranging from mid- 10^{17} cm^{-3} to more than 10^{20} cm^{-3} . We have calculated electron mobilities in InN, incorporating the standard mechanisms of acoustic and optical phonons, Coulomb scattering, and scattering from resonant defect states, and compared them with room temperature experimental values. The mobility in samples with carrier concentrations below the 10^{18} cm^{-3} level is limited by scattering from optical phonons and Coulomb centers. At concentrations between 10^{18} cm^{-3} and 10^{20} cm^{-3} , the mobility is dominated by Coulomb scattering alone. At the highest concentrations, above 10^{20} cm^{-3} , scattering from defects with energy levels resonant with the conduction band begins to play an important role. Our results also suggest that the defects from which the electrons originate may be multiply-charged. This work was partially supported by the US DOE under Contract No. DE-AC03-76SF00098.

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