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Thermopower measurements of n- and p-type InN J. W. AGER III, Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA , N. R. MILLER, R. E. JONES, Dept. of Materials Science and Engineering, University of California, Berkeley, CA, W. J. SCHAFF, Dept. of Electrical and Computer Engineering, Cornell University, Ithaca, NY, W. WALUKIEWICZ, Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA
— InN has the largest electron affinity, 5.8 eV, of any known semiconductor. At its surface, the Fermi level is pinned ca. 0.9 eV above the conduction band edge, leading to an electron accumulation layer in n-type material and an inversion layer in p-type material. Recently, we have used capacitance-voltage measurements with an electrolyte contact to deplete the surface inversion layer in Mg-doped InN and observe space charge due to ionized acceptors [1]. However, these measurements do not give information about the proportion of acceptors that are ionized, or about hole transport. Here, thermopower measurements are used to deduce the majority carrier type under the surface inversion layer in Mg-doped InN. Observation of a positive Seebeck coefficient provides direct and definitive evidence of mobile holes in InN:Mg. Temperature-dependent measurements from 200-300 K are consistent with degenerate conduction in the highly doped films. Modeling of the experimental data to determine the carrier effective masses and scattering mechanisms will be presented. [1] R. E. Jones *et al.*, *Phys. Rev. Lett.* **96**, 125505 (2006).

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