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Nitrogen doping of single crystal ZnO[1] M.D. MCCLUSKEY, S.J. JOKELA, M.C. TARUN, Washington State University — Zinc oxide (ZnO) is a wide band gap semiconductor with a range of potential optical, electronic, and mechanical applications. The lack of control over defects, in particular reliable *p*-type doping, is a problem that needs to be overcome. Nitrogen is a promising acceptor dopant. We incorporated nitrogen-hydrogen (N-H) complexes in ZnO during chemical vapor transport (CVT) growth, using ammonia as an ambient. Using commercial ZnO as a seed, we obtained bulk single-crystal growth. The N-H bond-stretching mode gives rise to an infrared (IR) absorption peak at 3150.6 cm^{-1} at liquid helium temperatures. Isotopic substitutions result in the expected frequency shifts, providing an unambiguous identification of these complexes. The N-H complexes are stable up to $\sim$700 $^{\circ}$C. Annealing in oxygen appears to enhance the dissociation of the N-H bond, an observation that could prove useful in achieving reliable *p*-type conductivity.

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