Growth of GaN from Ga:In and Ga:Sb liquid alloys\textsuperscript{1} KATHLEEN KASH, CHALLA BEKELE, JOHN ANGUS, Case Western Reserve University — We grew GaN from Ga:Sn and Ga:In melt solutions that varied in composition from pure Ga to a few at\% Ga. Growth was done at 900 °C and 100 mtorr pressure by exposing the melt surface to a nitrogen plasma. A fit to a model of growth rate versus melt composition yielded estimates of the reaction rates for the formation of GaN versus composition of the melt that were, within experimental uncertainty, independent of the choice of diluent. Near-band-edge emission features were prominent in the photoluminescence spectra at both room temperature and 10 K for material grown from the entire range of melt compositions for both diluents. Lattice parameters measured by powder x-ray diffraction spectroscopy revealed an interesting dependence on melt composition; the “a” lattice parameter varied by as much as 1\% and exhibited a minimum for material grown from melts with compositions between 60 and 70 at\% Ga, for both diluents. One motivation for this work is growth of large area, high quality single crystal substrates.

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