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**Effect of Hydrogen on nitrogen incorporation in RF nitrogen plasma assisted chemical beam epitaxy of III-V dilute nitrides** ARISTOTELIS FOTKATZIKIS, ALEXANDRE FREUNDLICH, University of Houston — We investigate the impact of hydrogen on the growth mode and structural and optical properties of GaAsN epilayers grown on GaAs by RF nitrogen plasma assisted chemical beam epitaxy. Hydrogen interaction with the N-plasma was monitored real time using optical spectroscopy. Epilayer thickness was maintained below the critical thickness for lattice relaxation and the evolution of the growth mode was studied using RHEED. Small quantities of hydrogen were introduced independently in the growth chamber and the increase of background H pressure was directly correlated with an increase of the $H_\alpha$ line, the 1st term of the Balmer series of the hydrogen atom, in the nitrogen plasma spectrum. The growth mode (RHEED reconstruction) was affected be the presence of hydrogen in the CBE chamber. In addition, high resolution X-ray diffraction indicates a significant drop in nitrogen composition for GaAsN epilayers fabricated under excess hydrogen in the growth chamber. Finally the later samples exhibit a blue shift of their bandgap (beyond the one associated with the composition drop) and a significant degradation of their low temperature PL signal.

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