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N-H_n complexes in GaAsN:H containing more than two H atoms[1]

LANLIN WEN, MICHAEL STAVOLA, W. BEALL FOWLER, Lehigh University, ANTONIO POLIMENI, MARIO CAPIZZI, University of Rome, GABRIELE BISOGNIN, MARINA BERTI, University of Padova — The III-N-V alloys have attracted much attention because of a large reduction of the band gap that occurs for N concentrations of a few percent. The hydrogenation of these alloys eliminates the effect of N.[1] IR experiments and theory revealed the properties of an NH_2 complex that can cause these novel effects.[2] Further studies by theory [3] and experiment [4] suggest the formation of defect complexes that contain more than two H atoms per N atom. In the present talk, new IR data provide experimental clues about the structures of NH_n defect complexes with n>2 that have been found in GaAsN samples that were hydrogenated at reduced temperature. [1] A. Polimeni et al., Phys. Rev. B **63**, 201204 (2001). [2] S. Kleekajai et al., Phys. Rev. B **77**, 085213 (2008) and the references contained therein. [3] A.A. Bonapasta et al., Phys. Rev. Lett. **98**, 206403 (2007). [4] M. Berti et al., Phys. Rev. B **76**, 205323 (2007).

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