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Intersubband absorption in InAlN/GaN heterostructures O. MALIS, C. EDMUNDS, Binghamton University, Binghamton, NY, M. J. MANFRA, D. L. SIVCO, Bell Labs, Alcatel-Lucent, Murray Hill, NJ, R. MOLNAR, MIT Lincoln Laboratories, Lexington, MA — Nitride superlattices are promising for intersubband light emission and detection in the currently inaccessible near-infrared range (2-3 μm). Efforts to exploits the nitride properties have been hampered so far by difficulties related to the quality of the materials. Most studies to date have employed AlGaN/GaN heterostructures. However, the large lattice mismatch between AlGaN and GaN limits the total thickness of the structures. We are focusing on lattice-matched InAlN/GaN superlattices. InAlN has been less investigated due to the challenges in growing high-quality In-containing nitrides. Nevertheless, the large conduction band offset (1 eV) and lack of piezoelectric effect make the lattice matched nitrides ideally suited for near-infrared applications. We have performed a detailed intersubband absorption study of InAlN/GaN superlattices grown by MBE on HVPE GaN templates. X-ray diffraction analysis suggests that our samples are among the highest quality ever reported. The band structure of the materials was examined with Fourier-transform infrared spectroscopy. Strong intersubband absorption in the 430-530 meV energy range is reported for the first time for 2-4.5 nm-wide quantum wells.

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