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Room temperature low threshold stimulated emission of electron beam-pumped AlGaN-based deep UV laser structures emitting below 250 nm A. NIKIFOROV, W. ZHANG, Boston University, J. WOODWARD, Boston, J. YIN, E. PECORA, Boston University, L. ZHOU, Arizona State University, L. DAL NEGRO, R. PAIELLA, Boston University, D. SMITH, Arizona State University, T. MOUSTAKAS, A. MOLDAWER, Boston University — The development of semiconductor lasers, operating in the deep UV, will find a number of applications such as identification of biological and chemical agents, non-line-off -sight free space communications and point of site medical diagnostics. In this paper we report the growth of QW laser structures in the configuration 6H-SiC / AlN / AlGaN - AlN MQWs /AlN by PAMBE. A novel growth mode was developed in which arriving active nitrogen species and aluminum atoms dissolve in the excess liquid Ga covering the surface of the growing film and incorporate into the AlGaN film from the liquid phase. This liquid phase epitaxy (LPE) growth was found to introduce band structure potential fluctuations and high-density of nanocluster-like features within the AlGaN wells. The structure and microstructure of these devices were investigated by AFM, XRD and TEM and their emission properties were investigated by electron beam pumping at room temperature. The investigated laser structures were found to emit in the 235-250 nm range and stimulated emission was observed at a threshold power of 20-40 KW / cm^2. This low threshold value is attributed to nanoclusters-like features in the wells.

Theodore Moustakas
tdm@bu.edu
Boston University

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