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Spectroscopic characterization of Er optical center in multiple quantum wells AlN/GaN:Er VINH HO, MATTHEW HAWKINS, Department of Physics, Virginia Tech, Blacksburg, Virginia 24061, HONGXING JIANG, JINGYU LIN, Department of Electrical and Computer Engineering, Texas Tech University, Lubbock, Texas 79409, JOHN ZAVADA, Department of Electrical and Computer Engineering, NYU Polytechnic School of Engineering, Brooklyn, New York 11201, NGUYEN VINH, Department of Physics, Virginia Tech, Blacksburg, Virginia 24061 — Er doped GaN material is known to result in the formation of luminescent centers suitable for applications in optoelectronic devices. We report here a significant enhancement of photoluminescence from the Er optical center at 1.5 micrometer in multi-nanolayer structures AlN/GaN:Er synthesized by metal organic chemical vapor deposition. The enhancement of photoluminescence from Er optical center can be explained via the carrier confinement and strain engineering of multi-nanolayer structures. We study the influence of the quantum wells and barrier width on the photoluminescence at 1.5 micrometer using time-resolved and high-resolution photoluminescence spectroscopy at a large range of temperature. The ability of controlling the carrier confinement in multi-nanolayer structures provides us the possibility of engineering Er doped GaN photonic devices with enhanced optical characteristics at 1.54 micrometer.

Vinh Ho
Department of Physics, Virginia Tech, Blacksburg, Virginia 24061

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