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Electroluminescence from Er doped III-nitride light emitters synthesized by metal organic chemical vapor deposition C. UGOLINI, J. Y. LIN, H. X. JIANG, Kansas State University, J. M. ZAVADA, U. S. Army Research Office — It has been well recognized that GaN is a very attractive host for Er due to the low degree of thermal quenching of radiative intra-4f Er^{3+} transitions and the large Er doping concentrations that can be achieved. These properties, in conjunction with the 1.54 μm transition of Er^{3+}, make Er doped GaN structures promising for light emitters and amplifiers operating at the telecommunication wavelength. Recently, our group has reported on the optical properties of Er doped GaN epilayers synthesized by metal organic chemical vapor deposition (MOCVD) using photoluminescence (PL). We now report on the electroluminescence (EL) of Er doped III-nitride light emitters synthesized by MOCVD. These structures were characterized with x-ray diffraction, atomic force microscopy, scanning electron microscopy, PL, EL, and Hall measurements. EL spectra of these emitters exhibit emission at 537 and 558 nm (intra-4f Er^{3+}transitions from the $^2H_{11/2}$and $^4S_{3/2}$ to the $^4I_{15/2}$, respectively), and at 1.0 and 1.54 μm (transitions from the $^4I_{11/2}$ and $^4I_{13/2}$ to the $^4I_{15/2}$, respectively). The effects of growth conditions such as temperature, V/III ratio, and growth rate will be discussed. EL from emitters of different Er concentrations as well as potential applications of these Er doped III-nitride light emitters will also be discussed.

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