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Comparison of single junction to multiple-quantum well quaternary GaInAsSb 2.2 μm light-emitting diode JINHUI TAN, JONATHAN OLESBERG, LEE MURRAY, JOHN PRINEAS, University of Iowa — A strained GaInAsSb/AlGaAsSb multiple-quantum well (MQW) light emitting diode (LED) emitting at 2.2μm infrared region is investigated. The heterostructure was grown by molecular beam epitaxy and consists of an active region which contains three compressively strained 12nm thick $Ga_{0.64}In_{0.36}As_{0.06}Sb_{0.94}$ QWs separated by 20nm thick $Al_{0.28}Ga_{0.72}As_{0.02}Sb_{0.98}$ barrier in a separate confined heterostructure. X-ray diffraction measurement was used to verify the MQW alloy composition. The sample was processed into variable sized surface emitting LEDs. The emission wavelength was measure with spectrograph and the electroluminescent power (L) was characterized versus current (I) and voltage (V). A peak emission power of 13mW/mm^2/sr from the 200x200μm^2 LED was observed at room temperature with 3000A/cm^2 peak drive current density at 1% duty cycle. Compared to the single junction bulk LED, the MQW LED exhibited an increase in the output power from 4.5 to 13mW/mm^2/sr. We will also present the analysis of series resistance and the radiative efficiency of these devices.

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