

Production MBE Growth of QuiC SLED with Emission in the Longwave Infrared for Custom Gas Sensing Solutions

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We have demonstrated quantum interband cascaded superlattice light emitting diodes (QuiC SLED) operating in the longwave infrared for gas sensing applications. Production scale growth of strained layer superlattice (SLS) based materials presents challenges associated with volume material manufacturing and requires solutions for both uniformity and consistency of material output. We have developed a MBE growth methodology for routine production of SLS materials for focal plane array applications and applied these capabilities to growth of QuiC SLED materials for the gas sensing market. The QuiC SLED materials were developed based on Terahertz Device's Version 1.5 technology node architecture and produced by IntelliEPI on an Sb-equipped Riber MBE6000 multi-wafer production MBE system. The multi-wafer growth run was characterized for defect levels, uniformity of deposition and wafer warpage. The QuiC SLED materials were processed into surface emitting diodes based on standard photolithography and wet chemical etching. Electroluminescence emission was measured by FTIR spectrometer at various operating temperatures and show emission within the LWIR spectral band. The emission peak wavelength decreased with drive current from 10.6 μm to 10.2 μm .

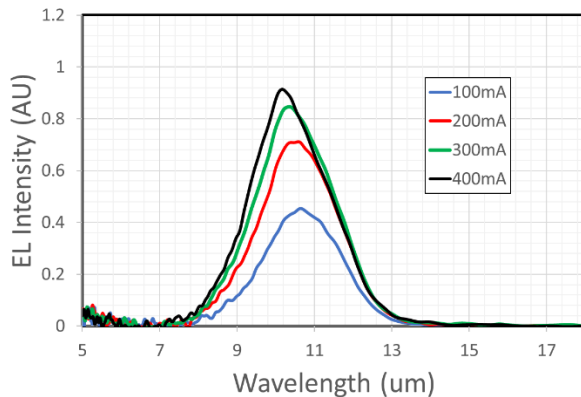


Figure 1: Electroluminescence emission at 77K operating temperature for QuiC SLED LW device.

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