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Insitu Contact Resistance Evaluation of 2.6-2.9 THz Quantum Cascade Lasers NEELIMA CHANDRAYAN, KRONGTIP TREMKOA, JIN LI, XIFENG QIAN, SHIVASHANKAR VANGALA, WILLIAM GOODHUE, Photonics Center, Dept. of Physics, UMass Lowell, ANDRIY DANYLOV, JERRY WALDMAN, ROBERT GILES, Sub-millimeter Wave Technology Lab, Dept. of Physics, UMass Lowell, WILLIAM NIXON, U.S. Army National Ground Intelligence Center — The fabrication of THz Quantum Cascade Lasers (QCL) requires a strong understanding of the two electrical contacts of the device. Contact resistance as well as contact/semiconductor interdiffusion properties must be designed to minimize series resistance, free carrier absorption, and e-e scattering. Here, insitu measurement of contact resistance using Transmission Line Measurement (TLM) pads has been implemented in the fabrication of 2.6-2.9 THz quantum cascade lasers. The measurement of contact resistances as part of device processing also verifies the correct etch depth of laser structure, uniformity of the etching, and the ohmic nature of the contacts. For example, the procedure has been used to successfully fabricate 2.93 THz lasers with 5 mW of continuous wave output power.

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