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The 32nd International Conference on Indium Phosphide and Related Materials

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The 47nd International Symposium on Compound Semiconductors

Workbook

WeA2.4 9:15

THz And Mid-infrared Optoelectronic Devices Based On Non-polar ZnO

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Zinc Oxide is a material new to intersubband optoelectronics for the mid-infrared to THz spectral range. Particularly, its (non-polar) m-plane orientation is an interesting candidate for the design and realization of complex quantum structures like in quantum cascade lasers (QCLs) and detectors (QCDs). But due to the novelty of the material system, it still has to be analyzed in detail for its material parameters in the wavelength range of interest as well as particular fabrication schemes for device realization have to be developed. We present a new device processing scheme for m-ZnO/ZnMgO heterostructures, based on inductively-coupled reactive ion etching (ICP-RIE) in a CH_4-based chemistry. The process is optimized for smooth and vertical sidewalls including low defect density and the suppression of surface leakage currents. Based on this, we realized and present: (i) the first THz-electroluminescence from m-Zn(Mg)O-based QCL structures as well as (ii) the first mid-infrared QCD in the m-plane Zn(Mg)O.

WeA2.5 9:30

Temperature Coefficient Of InGaAs MEMS Beam Resonators

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We have studied the temperature coefficient of the resonance frequency of doubly-clamped InGaAs microelectromechanical (MEMS) resonators. The resonance frequency of the MEMS resonator was measured as a function of the changes in the local/environmental temperature rises. We have found that, the resonance frequency of the MEMS resonator is sensitive only to the local heat in the MEMS beam, but is much less affected by the environmental temperature rise. This finding enables us to use the MEMS resonator as highly sensitive bolometers without a need of environmental temperature compensation.
