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标题: High performance InGaAs/GaAsSb terahertz quantum cascade lasers operating up to 142 K
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摘要: We report on the demonstration of a maximum operating temperature of 142 K for InGaAs-based terahertz quantum cascade lasers. This result is achieved by using the alternative material combination In0.53Ga0.47As/GaAs0.51Sb0.49, lattice-matched to InP, which exhibits fabrication advantages over standard In0.53Ga0.47As/In0.52Al0.48As due to more suitable material parameters. An active region, based on a three-well phonon depletion design, with improved injection and extraction tunneling coupling, was designed. The devices exhibit threshold current densities of 0.75 kA/cm(2) and provide peak optical powers up to 9 mW. A broad spectral emission range between 3.3 and 4 THz is measured. (C) 2012 American Institute of Physics. [http://dx.doi.org/10.1063/1.4766915]
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