176
Accession number:20114114412965
Title:Guiding a terahertz quantum cascade laser into a flexible silver-coated waveguide
Authors:Vitiello, Miriam S. (1); Xu, Ji-Hua (2); Beltram, Fabio (2); Tredicucci, Alessandro (2); Mitrofanov, Oleg (3); Harrington, James A. (4); E. Beere, Harvey (5); Ritchie, David A. (5)
Author affiliation:(1) CNR, Istituto Nazionale di Fisica Applicata Nello Carrara, Via Madonna del Piano 1, 50019 Sesto Fiorentino, Italy; (2) NEST, Istituto Nanoscienze CNR and Scuola Normale Superiore, Piazza San Silvestro 12, I-56127 Pisa, Italy; (3) Department of Electronic and Electrical Engineering, University College London, Torrington Place, London WC1E7JE, United Kingdom; (4) Department of Materials Science and Engineering, Rutgers University, 607 Taylor Rd., Piscataway, NJ 08854, United States; (5) Cavendish Laboratory, University of Cambridge, J. J. Thomson Avenue, Cambridge CB3 0HE, United Kingdom
Corresponding author:Vitiello, M.S.(miriam.vitiello@sns.it)
Source title:Journal of Applied Physics
Abbreviated source title:J Appl Phys
Volume:110
Issue:6
Issue date:September 15, 2011
Publication year:2011
Article number:063112
Language:English
ISSN:00218979
CODEN:JAPIAU
Document type:Journal article (JA)
Publisher:American Institute of Physics, 2 Huntington Quadrangle, Suite N101, Melville, NY 11747-4502, United States
Abstract:We report on a promising experimental approach to efficiently couple quantum cascade laser (QCL) sources fabricated in either surface emitting micro-ring resonator or standard edge emitting geometry with terahertz (THz) hollow waveguides. We show that the THz beam of a QCL can be guided into flexible silver-coated polycarbonate waveguides having length in the range 4-12 cm with coupling efficiencies 80. The dominant optical modes propagating through the waveguides can be selected by varying the polarization of the incoming QCL beam, the coupling geometries, and/or bending the hollow waveguide. Either the lowest loss TE11 or the TE01 mode can be selected and guided through the waveguide with propagation losses in the range 2.1-4.4 dB/m and bending losses lower than 1.2 dB.
Number of references:21