271.
标题: Various photonic crystal bio-sensor configurations based on optical surface modes
作者: Kurt, H (Kurt, Hamza); Erim, MN (Erim, Muhammed Necip); Erim, N (Erim, Nur)
来源出版物: SENSORS AND ACTUATORS B-CHEMICAL 卷: 165 期: 1 页: 68-75 DOI: 10.1016/j.snb.2012.02.015 出版年: APR 2012
在 Web of Science 中的被引频次: 0
被引频次合计: 0
引用的参考文献数: 25
摘要: We design a new bio-sensor concept that incorporates photonic crystal (PC) surface modes to sense small refractive index changes. The initial attempt creates optical surface modes by first enlarging and then perforating the radii of rods residing along the end surface of the square-lattice PC. The strongly confined mode which decays both evanescently along transverse to propagation direction interacts with the substance while propagating along the PC-air interface. Due to index change of the ambient medium, the transmission spectrum experiences linear shift with a large dynamic range. The relocation of the surface defects enhances the sensitivity of bio-sensor from similar to 8 to similar to 93 nm/RIU. The second type of investigated PC structure is based on triangular-lattice PC and it provides a surface state bio-sensor with a sensitivity of 117 nm/RIU. In addition to these designs, we propose a final structure that incorporates air slot along one side of triangular-lattice PC. We succeeded to obtain a new sensitivity value of 396 nm/RIU. The investigation shows that even higher sensitivities can be achieved. The different RIU values are reminiscent of group velocity of the relevant modes which can be extracted from the dispersion analysis. Compact, sensitive and label-free optical sensors based on surface modes may become part of the important applications in opto-fluidic technology and lab-on-a-chip. 
入藏号: WOS:000302669600013
语种: English
文献类型: Article
作者关键词: Sensors; Photonic crystals; Optical surface modes; Integrated optics; Waveguides
KeyWords Plus: TERAHERTZ REGION; WAVE-GUIDES; RESONATOR; MICROCAVITY
地址: [Kurt, Hamza; Erim, Muhammed Necip; Erim, Nur] TOBB Univ Econ & Technol, Dept Elect & Elect Engn, TR-06560 Ankara, Turkey
通讯作者地址: Kurt, H (通讯作者),TOBB Univ Econ & Technol, Dept Elect & Elect Engn, TR-06560 Ankara, Turkey
电子邮件地址: hkurt@etu.edu.tr
出版商: ELSEVIER SCIENCE SA
出版商地址: PO BOX 564, 1001 LAUSANNE, SWITZERLAND
Web of Science 分类: Chemistry, Analytical; Electrochemistry; Instruments & Instrumentation
学科类别: Chemistry; Electrochemistry; Instruments & Instrumentation
IDS 号: 924CY
ISSN: 0925-4005
29 字符的来源出版物名称缩写: SENSOR ACTUAT B-CHEM
ISO 来源出版物缩写: Sens. Actuator B-Chem.
来源出版物页码计数: 8