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Title:Proposal of composite photonic structure element for efficient terahertz generation

Authors:Oyamada, Atsuyuki (1); Kitaguchi, Hisanobu (1); Ebata, Keiji (2); Ishihara, Hajime (1)

Author affiliation:(1) Department of Physics and Electronics, Osaka Prefecture University, 1-1 Gekuen-cho, Naka-ku, Sakai, Osaka 599-8531, Japan; (2) Industrial Materials and Process Technology R and D Laboratories, Sumitomo Electric Industries Ltd., 1-1-1 Koyakita, Itami-shi, Hyogo 664-0016, Japan

Corresponding author:Oyamada, A.(a-oyamada@pe.osakafu-u.ac.jp)

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Abstract:In this study, we propose new terahertz generation method. When we inject pump and signal wave into periodic multilayer structure obliquely (abstract figure), transmission resonant mode splits into two modes, i.e. p-polarized mode and s-polarized mode. By using two modes for difference frequency generation (DFG), THz wave can generate. As a result of theoretical calculation, composite photonic structure shows high performance, i.e. the conversion efficiency up to $10^{>3}</sup>$ % and wide tuneable frequency ranging from a few hundred of GHz to 3 THz. Further, the thickness of this element is order of a few micrometers that includes resonator mirror parts and total optical system can become compact size. This scheme has potential to achieve tuneable continuous wave (cw) THz source at room temperature. © 2012 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

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Main heading:Terahertz waves

Controlled terms:Angle measurement - Conversion efficiency - Nonlinear optics - Optical frequency conversion - Optical systems - Photonic crystals - Thickness measurement

Uncontrolled terms:Compact size - Continuous waves - Difference-frequency generation - Downconversion - Frequency ranging - P-polarized - Periodic multilayers - Photonic structure - Resonant mode - Resonator mirrors - Room temperature - S-polarized - Signal waves - Terahertz generation - Theoretical calculations - THz sources - THz waves

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