71

Accession number:20123915466498

Title:Theoretical research on cascaded terahertz difference-frequency generation based on sphalerite crystals

Authors:Li, Jing-hui (1); Li, Xi-fu (2); Zhang, Hui-yun (3); Zhang, Yu-ping (3); Musideke, Mayilamu (2); Yao, Jian-quan (1)

Author affiliation:(1) Department of Computer Science and Technology, Renai College of Tianjin University, Tianjin 301636, China; (2) Key Laboratory on Optoelectronics Information Technology, Ministry of Education, Tianjin University, Tianjin 300072, China; (3) College of Science, Shandong Universing of Science and Technology, Qingdao 266510, China

Corresponding author:Li, J.-h.(itljh@126.com)

Source title:Optoelectronics Letters

Abbreviated source title:Optoelectron. Lett.

Volume:8

Issue:5

Issue date:September 2012

Publication year:2012

Pages:389-392

Language:English

ISSN:16731905

Document type:Journal article (JA)

Publisher:Springer Verlag, Tiergartenstrasse 17, Heidelberg, D-69121, Germany

Abstract:A theoretical model of cascaded terahertz (THz) difference-frequency generation is established based on one-dimensional coupled-wave equations. The relationships between sphalerite crystals' wave vector mismatches and difference-frequency pump waves are analyzed. To produce terahertz wave with the frequency of 1. 5 THz, 80-order cascaded difference-frequency is applied. By introducing crystal absorption, we calculate the optimum crystal length and pump frequency under actual circumstances. It is found that Stokes waves dominate the terahertz waves output in cascaded progress, and cascaded difference-frequency can increase the photon conversion efficiency obviously. © 2012 Tianjin University of Technology and Springer-Verlag Berlin Heidelberg.

Number of references:18

Main heading:Zinc sulfide

Controlled terms: Conversion efficiency - Terahertz waves

Uncontrolled terms:Crystal absorption - Crystal length - Difference frequency - Difference-frequency generation - Photon conversion efficiencies - Pump frequency - Pump waves - Stokes wave - Terahertz - Theoretical models - Theoretical research - Wavevector mismatch Classification code:525.5 Energy Conversion Issues - 711 Electromagnetic Waves - 804.2 Inorganic Compounds

DOI:10.1007/s11801-012-2236-3

Database:Compendex

Compilation and indexing terms, Copyright 2012 Elsevier Inc.