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Author

Yoshioka T. Takatori S. Pham Hong Minh. Cadatal-Raduban M. Nakazato T. Shimizu T. Sarukura N. Estacio E. Misa JV. Jaculbia R. Defensor M. Somintac A. Salvador A.

Author Unabbreviated

Yoshioka Takashi; Takatori Satoru; Cadatal-Raduban Marilou; Nakazato Tomoharu; Shimizu Toshihiko; Sarukura Nobuhiko; Estacio Elmer; Misa John Vincent; Jaculbia Rafael; Defensor Michael; Somintac Armando; Salvador Arnel

Author/Editor Affiliation

Yoshioka T. Takatori S. Pham Hong Minh. Cadatal-Raduban M. Nakazato T. Shimizu T. Sarukura N. : Institute of Laser Engineering, Osaka University, Suita 565-0871, Japan

Estacio E. : Research Center for Development of Far-Infrared Region, University of Fukui, 3-9-1 Bunkyo, Fukui 910-8507, Japan

Misa JV. Jaculbia R. Defensor M. Somintac A. Salvador A. : National Institute of Physics, University of the Philippines, Diliman, Quezon City, Philippines

Title

Terahertz Emission from GaAs Films on Si(100) and Si(111) Substrates Grown by Molecular Beam Epitaxy

Source

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Abstract

We report on the terahertz emission from femtosecond-laser-irradiated GaAs layers grown on Si(100) and Si(111) substrates. The results show that the terahertz emission from GaAs on Si is stronger than that of a semi-insulating bulk GaAs crystal. This increase is attributed to the strain field at the GaAs/Si interface. In the GaAs of the Si(100) sample, the stronger terahertz emission is observed compared with GaAs on Si(111). Moreover, the effect of changing the doping type of the Si substrate from n-type to semi-insulating was also studied and it was found that the terahertz emission intensity of GaAs on semi-insulating Si(100) is stronger than that of GaAs on n-type Si(100). Finally, strong terahertz emission from GaAs on semi-insulating Si(100) was observed not only in the reflection geometry but also in the transmission geometry. These results hold promise for new applications of terahertz optoelectronics. (24 References).