

296. Title: Efficient parametric terahertz generation in quasi-phase-matched GaP through cavity enhanced difference-frequency generation

Authors: Petersen, Eliot B. (1); Shi, Wei (1); Chavez-Pirson, Arturo (1); Peyghambarian, N. (1); Cooney, Adam T. (4)

Source title: Applied Physics Letters

Abbreviated source title: Appl Phys Lett

Volume: 98

Issue: 12

Issue date: March 21, 2011

Publication year: 2011

Language: English

Document type: Journal article (JA)

Abstract: We report an efficient parametric terahertz (THz) source by using bonded quasi-phase-matched (QPM) GaP crystals pumped by the C-band pulsed fiber lasers in a master oscillator power amplifier configuration, based on difference frequency generation (DFG). We observed that the QPM-GaP crystals can effectively increase the THz generation power and efficiency by increasing the number of periods. Moreover, we observed external cavity enhanced THz DFG by placing the QPM-GaP crystal in an external ring cavity. The THz cavity enhancement factor of approximately 250 has been achieved in comparison with a single-pass THz DFG. The maximum THz average power can reach $339 \mu\text{W}$, corresponding to a power conversion efficiency of 2.43×10^{-4} and a quantum efficiency of 3.16%.