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Title:Simulation and fabrication of one dimensional terahertz photonic filter
Authors:Li, Ling (1); Liao, Hui (1); Huang, Jing-Zhen (1); Zhai, Jian-Pang (1)
Author affiliation:(1) Shenzhen Key Laboratory of Laser Engineering, College of Electronic Science and Technology, Shenzhen University, Shenzhen 518060, China
Corresponding author:Li, L.(liling@szu.edu.cn)
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Abstract:The theoretical and experimental results of one dimensional (1D) terahertz (THz) filter were introduced based on photonic band gap structures. The periodic structures were fabricated by artificial stacking method. The polytetrafluoroethylene or polyethylene slices were used as high refractive index layers, and the alloy slices with hole in center were used as air layers. The transmission spectra were measured by a terahertz time domain spectroscopy. The measured frequency range was 0.1-0.9 THz. The measured results consisted well with the simulated data. Based on theoretical and experimental data, a band-stop filter with central frequency at 0.3 THz was designed and fabricated by polyethylene (PE). The duty cycle was 0.5, and the period was 400 μm. The 3 dB bandwidth was 0.08 THz, which was close to the simulated result (0.07 THz).
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Main heading:Fabrication
Controlled terms:Notch filters - Photonic band gap - Photonic crystals - Polyethylenes - Refractive index - Terahertz waves - Thermoplastics - Time domain analysis
Uncontrolled terms:3 dB bandwidth - Air layers - Band-stop filters - Central frequency - Duty cycles - Experimental data - Frequency ranges - High refractive index - High-refractive-index materials - Measured results - Photonic band-gap structures - Simulated data - Simulated results - Stacking method - Terahertz - Terahertz photonics - Terahertz time domain spectroscopy - Time domain spectroscopy - Transmission spectrums
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