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Author
Voisiat B. Biciunas A. Kasalynas I. Raciukaitis G.
Author/Editor Affiliation
Voisiat B. Biciunas A. Kasalynas I. Raciukaitis G. : Center for Physical Sciences and Technology, Vilnius 02300, Lithuania
Title
Band-pass filters for THz spectral range fabricated by laser ablation
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Abstract
The terahertz resonant metal-mesh filters were fabricated using the laser direct writing technique. UV picosecond laser was employed to cut matrixes of cross-shaped holes in stainless steel foil and molybdenum layer deposited on polyimide substrate. Different laser processing strategies were developed: holes were cut through in the metal foil and the molybdenum film was removed from the polyimide by laser ablation. Band-pass filters with a different center frequency were designed and fabricated. The regular shape, smoothness of edges and sharpness of corners of the cross-shaped holes in the metal were the main attributes for quality assessment for the laser ablation process. Spectral characteristics of the filters, determined by the mesh period, cross-arm length, and its width, were investigated by terahertz time-domain spectroscopy and conventional space-domain Fourier transform spectroscopy. Experimental data were supported by three-dimensional finite-difference time-domain simulations. (15 References).