177
Accession number:20114114413117
Title:Terahertz propagation properties of free-standing woven-steel-mesh metamaterials: Pass-bands and signatures of abnormal group velocities
Authors:Sabah, Cumali (1); Thomson, Mark D. (1); Meng, Fanzhen (1); Tzanova, Slava (1); Roskos, Hartmut G. (1)
Author affiliation:(1) Physikalisches Institut, Johann Wolfgang Goethe-Universitat, Max-von-Laue-Str. 1, D-60438 Frankfurt am Main, Germany
Corresponding author:Sabah, C.(sabah@physik.uni-frankfurt.de)
Source title:Journal of Applied Physics
Abbreviated source title:J Appl Phys
Volume:110
Issue:6
Issue date:September 15, 2011
Publication year:2011
Article number:064902
Language:English
ISSN:00218979
CODEN:JAPIAU
Document type:Journal article (JA)
Publisher:American Institute of Physics, 2 Huntington Quadrangle, Suite N101, Melville, NY 11747-4502, United States
Abstract:We explore steel-mesh structures, which are commercially available as insets of chemical particle filters, in terms of their metamaterial properties below 1 THz, including both single- and multi-layer structures. Their pass-band characteristics are very similar to those reported for hole arrays in metal films, exhibiting power transmission as high as 88 for the lowest transmission band of single-layer structures. The transmission minima are explained in terms of the Rayleigh-Wood anomaly. The phase properties of the transmitted THz pulses reveal negative group delays of several picoseconds, i.e., abnormal group velocities, in spectral regions between pass-bands.
Number of references:27