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Accession number:WOS:000305560100006

Title:Tunable negative index metamaterial employing in-plane switching mode at terahertz frequencies

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Source title:LIQUID CRYSTALS

Abbreviated source title:LIQ CRYST

Volume:39

Issue:7

Issue date:2012

Pages:827-831

Language:English

ISSN:0267-8292

Document type:Article

Publisher: TAYLOR & FRANCIS LTD, 4 PARK SQUARE, MILTON PARK, ABINGDON OX14 4RN, OXON, ENGLAND

Abstract:We analysed the response of a tunable liquid crystal metamaterial transducer in the terahertz frequency range. Tunability of scattering parameters is achieving by an in-plane switching (IPS) effect. The metamaterial structure is based on Omega-shape resonators. A full-wave analysis technique based on the finite-difference time-domain (FDTD) method was performed using the QuickWave 3D electromagnetic solver. Terahertz transmission properties of the metamaterial structure can be controlled by the director of the liquid crystal layer. The effective refractive index for operation frequency varies from negative to positive values. A novel approach to switching of metamaterial transducer by IPS mode is presented.

Number of references:18

Main heading:Crystallography

DOI:10.1080/02678292.2012.684461