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Title

A tunable terahertz filter and its switching properties in terahertz region based on a defect mode of a metallic photonic crystal

Source

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Abstract

We theoretically investigate and discuss an electrically tunable terahertz filter design and its optical switching properties based on the defect mode of a woodpile metallic photonic crystal (MPC). The model filter design is based on a dual use of an MPC as a resonator and as electrodes with a liquid crystal used as a defect layer. The static and the dynamic responses of a realistic liquid crystal are obtained using the Oseen-Frank elastic continuum theory, and the corresponding transmission spectra are calculated using an analytic modal expansion method combined with a transfer-matrix method. The tuning range of f = 1.430~1.577 THz and the order of milliseconds switching property are observed in our design. (21 References).