Abstract

Tuning of Anisotropic Optical Properties of Two-Dimensional Dielectric Photonic Crystals

Chul-Sik KEE, Kihong KIM, and Han-jo LIM[¶]

Department of Electrical Engineering
Ajou University
Suwon 442-749
Korea

hanjolim@ajou.ac.kr

Received: Fri, 29 Mar 2002 23:03:59

We investigate theoretically the practical methods of tuning the anisotropic long-wavelength optical properties of two-dimensional (2D) dielectric photonic crystals (PCs), based on the formulas derived by Halevi et al. An efficient tuning can be achieved by slightly distorting the symmetry of 2D PCs by applying an external shear stress to the two edges of the PCs. Another method is to tune the dielectric constant of one of two constituents, for instance, that of the liquid crystal infiltrated in 2D PCs by changing temperature. The variation of birefringence observed in the structures studied in this work is shown to be larger than the birefringence of quartz. This makes the tunable anisotropic optical properties to be very attractive for applications in polarization optical devices. We also discuss the effects of tuning on the superprism phenomenon in PCs.

[¶]Presenter

Filename: Kee-C-S
Last document update: Wed Jul 10 08:15:31 MDT 2002