

Variation in the absolute photonic band gap of rods ranging from square to octagonal in square lattices

Chung-An Hu, Kuo-Pin Chang, Su-Lin Yang, Lin-Fang Shen, 吳家和, 楊宗哲

Ph. D. Program in Engineering Science

Engineering

yangtj@chu.edu.tw

Abstract

The band structures and field patterns of dielectric rods in square lattices are calculated using the plane-wave method. The rods with various cross-sectional shapes from square to octagonal at a fixed-filling factor are constructed to assess the geometry effect of photonic crystals to their band gap properties. Analytical results indicate that the corner profiles of rods significantly affect the E- and H- polarization bands in resonance frequency and field distribution. The absolute photonic band gap is closed in the square lattice when square dielectric rods are replaced with octagonal dielectric rods.

Keyword : Band structure, dielectric rods, square lattice, octagonal rods, absolute photonic band gap, square rods, plane-wave method