

Variation in the Absolute Photonic Band Gap of Rods Ranging from Square to Octagonal in Square Lattices

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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 : photonic band gap, square lattice