

# Band gap studies of 2D photonic crystals with hybrid scatterers

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## Abstract

Two-dimensional (2D) photonic crystals (PCs) of a square lattice with dielectric hybrid rods in air are proposed; these PCs consist of a square rod at the center of the unit cell and additional circular rods with their outermost edges against the middle of each side of the lattice unit cell. The band gap structures of PCs can be tailored and optimized by rotating the square rods and adding circular rods to the lattice unit cell. The variation of bands near the complete photonic band gap boundaries, due to some specific modes, is sensitive to certain structural parameters of the system. The results can be understood by analyzing the spatial energy distribution of the electromagnetic fields. Based on such a field analysis, a novel interpretative model is proposed. The PC can be fabricated easily and operated in the microwaveregion and, hence, should be suitable for applications in new microwave devices.

Keyword : Photonic band gap, photonic crystals, microwave