Genetic algorithm for band gap optimization under light line in two-dimensional photonic crystal slab

Wei Jia, Liyong Jiang, Hipeng Li, Gaige Zheng, Xiangyin Li

Keywords

two-dimensional photonic crystals, photonic band gap under light line, genetic algorithm

Abstract

An optimization algorithm is used to design a two-dimensional photonic crystal slab for large absolute band gaps under light line. In this procedure, the unit cell of the crystal is composed of a number of circular holes in silicon substrate arranged in hexagonal lattice. By optimizing the location and radius of circular hole in the unit cell, we present four designs considering different circular hole numbers. The genetic algorithm finally yielded a photonic crystal with an absolute common band gap of $0.0788(2\pi c/a)$ at the mid-frequency of $0.3714(2\pi c/a)$.

2.7 MB

Back to list