

Abstract

Numerical Study on Localized Defect Modes in Two-Dimensional Lattices: A High Q -Resonant Cavity

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The spectral widths and the quality factors of defect modes localized for different defects structures formed in a two-dimensional photonic crystal composed of a square lattice of circular rods of indium antimonide (InSb) are theoretically investigated. It is first shown that some factors such as the lattice nature, the line defect orientation, the nature and the defect width have a significant influence on the optical properties of the studied structures and can improve the Q factor and defect peak transmission intensity. Particularly, the transmission spectra of the defects calculated by means the transfer-matrix-method for a particular structure of eight line defects introduced in its center showed a high quality factor which exceeded 4×10^5 . This is an important issue for the fabrication of photonic crystals with such desired properties.

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