

High-transmission-efficiency 120° photonic crystal waveguide bend by using flexible structural defects

Abstract

We numerically studied a high-output-transmission-efficiency low-reflection-loss 120° photonic crystal (PhC) waveguide bend based on a PhC slab with triangular-lattice air holes. The desired high output transmission efficiency was achieved by introducing flexible structural defects into the bend region of the waveguide. Simulation results obtained using a 3-D finite-difference time-domain method indicated that normalized output transmission as high as 94.3% and negligible normalized reflection loss of 0.1% were obtained at the 1550-nm optical wavelength. Furthermore, the normalized output transmission was more than 90% within the entire optical C-band. In addition, sensitivity of the design parameters of the structural defect was studied to understand the tolerance in the fabrication error, while maintaining high output transmission efficiency.

Keyword: Photonics crystal; Waveguides; Waveguide devices; Optical interconnect