

The optical properties of Bragg fiber with a fiber core of 2-dimension
elliptical-hole photonic crystal structure

Jin-Jei Wu, Daru Chen, Kun-Lin Liao, 楊宗哲, W. L. Ouyang

Electrical Engineering

Engineering

yangtj@chu.edu.tw

Abstract

The optical properties of birefringent Bragg fiber with a fiber core of 2-dimension (2D) elliptical-hole photonic crystal structure has been studied. Elliptical air holes are introduced into the fiber core to form a normal 2D photonic crystal structure with a hole pitch (center-to-center distance between the air holes) much smaller than the operation wavelength of the Bragg fiber. The elliptical-hole photonic crystal structure acts as an anisotropic medium with different effective indices for transmission light of different polarization, which inevitably results in high birefringence (up to the order of magnitude of 0.01) of the Bragg fiber. The proposed Bragg fiber possesses different band-gaps for differently polarized mode. Besides the periodic alternating layers of high/low refractive indices, the bandwidth of the band-gap is also dependent on the effective index of the fiber core, which can be controlled by the area of the elliptical air holes.

Keyword : *