Abstract

Photonic crystal fibres –micro structured fibre consisting of air hole arrays running along its length- have attracted much attention for fibre device application because of its unusual optical properties that are not realized in standard optical fibre, such as high birefringence, high nonlinearity, low confinement loss and tailorable chromatic dispersion. High birefringent PCF can be designed by breaking the circular symmetry and implementing asymmetric defect structures such as dissimilar air hole diameter, varying the number of circular and elliptical air holes. This paper proposes a highly birefringent PCF with ultra-low confinement loss by introducing four ring solid core hexagonal structure which having both elliptical and circular air holes and introducing large air hole diameters near the core region for making the asymmetry. The modal birefringence, refractive indices, confinement loss and chromatic dispersion are calculated by using Finite element method (FEM). An endlessly single mode, high birefringent (0.152x10-3) and a low confinement loss (7.85x10-5 dB/km) found at the excitation wavelength of λ=1550nm with only four rings of air holes in the fiber cladding.

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Index Terms

Computer Science
Photonic Crystal Fibres,
Birefringence, Confinement Loss, Finite-element Method (fem)
Keywords
Data Communications