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NUMERICAL ANALYSIS OF THE CHARACTERISTICS OF GLASS PHOTONIC CRYSTAL FIBERS INFILTRATED WITH ALCOHOLIC LIQUIDS

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Abstract. *The characteristics of photonic crystal fibers (PCFs) with various air hole diameters infiltrated with alcoholic liquids such as ethanol, methanol, propanol and butanol are numerically investigated. Based on the numerical results, we have analyzed and compared in detail the characteristics of these fibers including effective refractive index, effective mode area, dispersion and confinement loss for two sets of parameters* $\{d,\Lambda\} = \{1\ \mu m, 5\ \mu m\}$ *and* $\{1.42\ \mu m,\ 3.26\ \mu m\}$*, with d the air hole diameter and* Λ *the lattice constant, respectively. The PCF infiltrated with ethanol and butanol shows better near zero flattened dispersion property at 1.42* μ*m and 1* μ*m wavelength, respectively. The values of effective refractive index, effective mode area, dispersion and confinement loss decrease in an orderly manner from butanol, propanol, ethanol to methanol and all the alcoholic liquid's curves of dispersion are flat and are very close to each other and near the zero dispersion curve. The proposed PCF shows a promising prospect in technology applications such as supercontinuum generation.*

Keywords: Photonic crystal fiber, effective refractive index, effective mode area, dispersion, confinement loss, nonlinear optics.

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