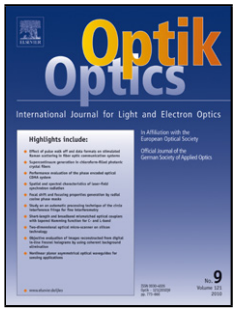

Title: Dodecagonal Photonic Crystal Fibers with Negative Dispersion and Low Confinement Loss

Authors: Pranaw Kumar, Rohan, Vikash Kumar, Jibendu Sekhar Roy

PII: S0030-4026(17)30808-2
DOI: http://dx.doi.org/doi:10.1016/j.ijleo.2017.06.131
Reference: IJLEO 59394

To appear in:

Received date: 6-4-2017
Accepted date: 30-6-2017

Please cite this article as: Pranaw Kumar, Rohan, Vikash Kumar, Jibendu Sekhar Roy, Dodecagonal Photonic Crystal Fibers with Negative Dispersion and Low Confinement Loss, Optik - International Journal for Light and Electron Opticshttp://dx.doi.org/10.1016/j.ijleo.2017.06.131

Dodecagonal Photonic Crystal Fibers with Negative Dispersion and Low Confinement Loss

PranawKumar[1*], Rohan[2], Vikash Kumar[3] and JibenduSekhar Roy[4]
[1,2,4]*School of Electronics Engineering, KIIT University, Bhubaneshwar,* [3]*Indian School of Mines, Dhanbad*
Corresponding author: kumarpranaw9@gmail.com

Abstract: Dodecagonal photonic crystal fibers (PCFs) filled with organic materials like propanol, butanol and ethanol have investigated. Intention is to study the behavior of light in alcoholic groups. Propanol filled structure reports negative dispersion with high birefringence. Besides ethanol and butanol filled structure reports zero dispersion at communication wavelength. The overall birefringence reported is of order 10^{-3}. The simulated structure has confinement loss of the order of 10^{-6} which is very low. Besides other properties like effective mode area, normalized frequency have also been studied.

Keywords—Photonic crystal fibers, dispersion, birefringences, normalized frequency, effective mode area.

1. Introduction

Photonic crystal fiber, due to its numerous unique properties, have been extensively used since it's discovery in the late 90's [1]. Several unique features like endlessly single mode [2], birefringence [3], dispersion [4], large mode area [5] and low attenuation [6] makes PCFs more advantageous over conventional optical fiber. PCFs are manufactured by a single material with a periodic arrangement or array of air holes which runs along the fiber length. Basically, PCFs are a special class of optical waveguides [7-8] and offers unique light guiding mechanism. PCFs