

## Design and optimization of highly sensitive photonic crystal fiber with low confinement loss for ethanol detection

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### Abstrak

In this paper, two highly sensitive photonic crystal fiber (PCF) structures with microstructure core and cladding have been demonstrated for Ethanol sensing. The microstructure core of both proposed PCFs is designed with supplementary holes in an octagonal formation. We have investigated the relative sensitivity and the confinement loss of the proposed PCF structures employing a full vectorial finite element method (FEM). The proposed PCFs work at a wide transmission band covering 0.8  $\mu\text{m}$  to 2  $\mu\text{m}$  and exhibit high sensitivity and low confinement loss simultaneously. The numerical analysis shows that the circular shape of air holes in the first ring is a more salient attribute for increasing sensitivity and the presence of the square shape of air holes in the first ring shows better performance to reduce confinement loss.