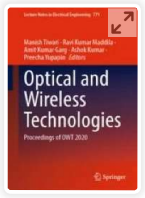

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Dispersion Engineered $AsSe_2$ Based Chalcogenide Photonic Crystal Fiber for MIR Region Supercontinuum Generation

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Abstract

A highly nonlinear chalcogenide glasses have been studied in this paper for a broadening supercontinuum generation. This research demonstrates the generation of supercontinuum expanding from 1000 nm to over 15,000 nm through pumping pulse of peak power 5 kW in an extremely nonlinear $AsSe_2$ based chalcogenide microfiber. The conventional ring-shaped air vents in the cladding region are improved by fitting elliptical air vents in the second ring of the proposed microfiber design. The geometrical parameters of the modeled design of the fiber are selected to instate a flat and broad profile of dispersion in the anomalous region. The reported photonic crystal fiber shape propose a very large nonlinearity of 1522 W^{-1} km^{-1} with low and flattened dispersion at 3.9 μm pump wavelength. The effective mode area is 11.6464 μm^2 of the propagating mode at the pump wavelength. This type of extremely nonlinear photonic crystal fibers are the strong candidates for nonlinear applications, namely slow-light and supercontinuum generation. The applications of the supercontinuum are also discussed in this paper.