Fabrication of Polymer Photonic Crystal Fiber

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Abstract

The polymer based photonic or microstructured optical fibers with low-cost manufacturability, and the mechianical and chemical flexibility offer key advantages over convenyiomal silica based photonic crystal fibers. The polymer photonic crystal fiber is fabricated by careful stacking an arry of PMMA capillaries to form a preform, and follwed by fusing and drawing into fiber on a fiber-drawing tower. The polymer photonic crystal fiber with 2 μm~ 12 μm periodical air holes was successfully fabricated The libht (λ=1280 nm and 632 nm)coupled into this core does indeed travel along long lengths of fiber and remain a single guided mode. The effects of drawing parameters including the temperature and time duration of sintering as well as the drawing temperature and speed on the microstructure or polymer fiber are discussed. The optimum coditions for the fabrication of high quality polymer photonic crystal fibers are also investigated.

Keyword：Fabrication, polymer photonic crystal fiber, PMMA, preform