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Review of Fabrication Techniques of Fiber Gratings

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This study describes the various techniques used in fabricating standard and complex Bragg grating structures in optical fibers. The objective here is to review a detailed outlook on the technology for inscribing Bragg grating structures. The fiber Bragg grating represents a periodic variation of the refractive index of the fiber core along the length of the fiber. Writing a fiber grating optically in the core of an optical fiber requires irradiating the core with a periodic interference pattern. Depending on the fabrication technique employed, Bragg gratings may be labeled as internally or externally written. Although internal Bragg gratings may not be considered are very practical or useful, nevertheless it is important to consider them, thus obtaining a complete historical perspective. Far more useful, Bragg gratings are inscribed using external techniques such as the interferometric, point-by-point and phase mask which overcome the fundamental limitation of internally written gratings. Although, these processes were initially considered difficult due to the requirements of submicron resolution and thus stability, today they are well controlled and the inscription of Bragg gratings using these techniques is considered routine. One of these methods (phase mask) has been used to fabricate the fiber Bragg grating for the sensitivity application such as temperature and strain sensor. The main aim of this article is to compare these methods and the selection of the optimal method for the fabrication of required fiber Bragg grating.