



sensors



Special Issue Reprint

Fiber Bragg Grating Sensors: Recent Advances and Future Perspectives

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This reprint aims to explore one of the most popular trends of relevance to sensors, which represents an influential platform for the exchange of scientific knowledge in the field of FBGs from the point of view of its recent advances and future perspectives. We are opening small, but very interesting pages in FBGs' 35-year history. The first section is devoted to the modernization of FBG basics and its performance in various conditions: line-by-line inscription of tilted FBGs, radiation effects on FBGs, and short-term creep effect on strain transfer from fiber-reinforced polymer strips. The second one details new approaches to interrogation methods: a detailed algorithm of FBG spectrum distortion correction for classical OSA with CCD elements and noise analysis of new microwave photonic interrogation of fiber-based sensors. The next section reflects the results of using FBGs in aviation systems: noise cancellation of helicopter blade deformations, design of a high-precision shape sensor for wing shape reconstruction, and development of a medium-frequency accelerometer based on flexible hinges. We separately discuss the transfer of FBG technologies to new devices based on integral photonics and new mediums in which FBGs can gain new life: modeling a fully integrated micro-ring-based photonic system for liquid refractometry and designing wavelength-tunable vortex beam emitters based on silicon micro-rings and twisted few-mode optical fibers with improved height of quasi-step refractive index profiles.



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