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Hybrid fiber sensors based on self-written polymer waveguide

Silica based optical fibers composed of different commercial and specialty fibers spliced together for the measurement of physical parameters were developed. These structures were interfaced with self-written waveguides (SWWs) based on UV curable polymers, forming a thin Fabry-Perot (FP) polymer cavity in front of the fiber tip after UV exposure from the fiber structure itself. This method was developed and characterized in fibers composed of single mode, multimode, air capillaries, microstructured fibers, and a combination of the above. Both Norland Adhesives (NOAs) and OrmoCers were used as the polymers of choice for the self-growing photopolymerizing method. These structures were characterized to temperature and humidity, where the combination of the fiber FP interferometers (FPI) located in silica and/or air and the polymer FPI give rise to a hybrid sensing structure that can simultaneously detect two or more measurands. Additionally, a study of the annealing of the SWWs was carried out, which revealed a varying temperature sensitivity of the polymer based on the degree of curing it presented.

Which topic best fits your talk?

Optics and Photonics

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