proceedings

Abstract

Exploiting Optical Fibers and Slab Waveguides for a New Intensity-Based Refractometer †

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† Presented at the 5th International Symposium on Sensor Science (I3S 2017), Barcelona, Spain, 27–29 September 2017.

Published: 4 December 2017

Refractive index sensors based on optical fibers have more advantages than those based on different approaches, for example, the possibility of remote sensing. A plasmonic sensor in plastic optical fibers (POFs) has been recently proposed by the Authors and consists of a D-shaped POF with a buffer layer between the exposed POF core and a thin gold film. In the present investigation, a new intensity-based sensor platform for refractive index sensing, is presented. It is based on a special holder, a slab waveguide and two POFs. The optical fiber is used to launch the light into the slab waveguide and to collect the light emerging from the waveguide and conveying it to a spectrometer. A photoresist buffer layer (Microposit S1813, Shipley Company, Marlborough, MA) is deposited over a polymethyl methacrylate (PMMA) chip (slab waveguide) by a spin coater machine. This photoresist buffer layer is required in order to increase the performances of the sensor. The experimental results indicated that this new sensor can be useful for chemical sensing applications. The advantages of this new approach are the possibility of sensing with a removable chip, the easy production of an engineered platform and the use of a new holder, which is also suitable for thermo-stabilized flow cells implementation.