IMMUNOASSAY-BASED COPOLYMER-FUNCTIONALIZED LONG PERIOD GRATING AS A TOOL FOR LABEL-FREE BIOSENSING

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The refractive index (RI) measurements have been used for many years in numerous fields, ranging from the characterization of materials to the sensing of both physical and biochemical parameters. This kind of measurement gives the unique opportunity to detect biochemical species directly (i.e., label-free techniques), without resorting to luminescence- or absorption-based measurements, and can also be efficiently performed with the use of an optical approach, such as surface plasmon resonance, interferometric configurations, optical resonators and, very recently, optical fiber long period gratings (LPGs) [1]. Thanks to their high RI sensitivity [2] and to the distinctive advantages of the use of optical fibers [3], LPGs can be accounted as a new and hopeful tool for label-free biosensing [3-5].
Herein, we propose a copolymer-functionalized LPG-based biosensor, placed inside a thermo-stabilized flow cell [6]. A biochemical interaction along the grating region changes the biolayer RI and thickness, and a change in the fiber transmission spectrum is expected consequently. The functionalization of the fiber surface has been performed with a chemistry using Eudragit L100 copolymer as opposed to the silanization procedure. An IgG/anti-IgG immunoassay has been implemented in order to study the antigen/antibody interactions. The biosensor has been characterized completely, monitoring the kinetics during the antibody immobilization and the antigen interaction at different concentrations (0.1–500 μg mL^{-1}) for achieving the calibration curve of the assay. Experimental results proved good performance of the biosensor, with a limit of detection of 500 ng mL^{-1}.

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