



Non-enzymatic D-glucose plasmonic optical fiber grating biosensor

Maxime Lobry^a, Driss Lahem^b, Médéric Loyez^c, Marc Debliquy^d, Karima Chah^a, Mariel David^a, Christophe Caucheteur^{a,*}

^a Electromagnetism and Telecommunication Department, University of Mons, 31 Bld Dolez, 7000 Mons, Belgium

^b Materia Nova ASBL, Materials R&D Centre, Avenue Nicolas Copernic 3, 7000 Mons, Belgium

^c Proteomics and Microbiology Department, University of Mons, 6 Av. du Champ de Mars, 7000 Mons, Belgium

^d Materials Science Department, University of Mons, 56 Rue de l'Épargne, 7000 Mons, Belgium



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ABSTRACT

Saccharide sensors represent a broad research area in the scope of sensing devices and their involvement in the medical diagnosis field is particularly relevant for cancer detection at early stage. In that context, we present a non-enzymatic optical fiber-based sensor that makes use of plasmon-assisted tilted fiber Bragg gratings (TFBGs) functionalized for D-glucose biosensing through polydopamine (PDA)-immobilized concanavalin A (Con A). Our probe allows a live and accurate monitoring of the PDA layer deposition leading improved surface biochemistry. The SPR shift observed was assessed to 3.83 ± 0.05 nm within 20 min for a 2 mg/mL dopamine solution. Tests performed in different D-Glucose solutions have revealed a limit of detection close to 10^{-7} M with the highest sensitivity in the 10^{-6} to 10^{-4} M range. This configuration has the capability to overcome the limitations of current enzyme-based solutions.

* Corresponding author.

E-mail address: christophe.caucheteur@umons.ac.be (C. Caucheteur).

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