OPTICAL FIBER EXHALED BREATH SENSOR BASED ON LOSSY MODE RESONANCE USING A GRAPHENE OXIDE SENSITIVE COATING

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ABSTRACT TEXT

Optical fiber sensors (OFS) have attracted increasing attention due to their benefits over traditional sensors, such as small size, biocompatibility, remote sensing ability or safety in flammable environments. Among the different existing configurations of OFS, those based on electromagnetic resonances are very popular as they are reliable, robust and very sensitive. In particular, sensors based on lossy mode resonance (LMR) are very interesting as a wide range of materials, including metal oxides and polymers, can support them and they do not require specific equipment to tune the optical polarization.

Graphene-based materials like graphene oxide (GO) or reduced graphene oxide (rGO) have become the most explored materials since Novoselov and Geim achieved its isolation in 2004. Their superior properties, such as high surface area or extreme sensitivity to the external environment, make them ideal candidates for the fabrication of the sensitive coatings required by LMR-based sensors .

In this work, the fabrication and characterization of a small and portable exhaled breath LMR-based OFS using GO as sensitive coating is presented. Refractive index changes have been detected showing a fast repetitive behavior with a response time of 150 ms from inhalation to exhalation and a high average sensitivity of 410 nm/RIU.