

*Abstract*

# Analysis of SPR Sensors in D-Shaped POF Realized by Hand and Mechanical Polishing <sup>†</sup>

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Optical fiber sensors based on Surface Plasmon Resonance are today widely proposed for applications in different areas of bio-chemical and chemical sensing. Among them, SPR sensors based on plastic optical fibers (POFs) can offer advantages due to their low cost, flexibility, robustness and simplicity of fabrication. Recently, authors reported several bio-chemical and chemical applications based on an SPR sensor platform in D-shaped POFs. The adopted D-shaped fabrication procedure is based on the insertion of a portion of the POF fiber (about 10 mm long) in a resin support and on a successive hand grinding of the fiber surface. This procedure guarantees an easy and low-cost effective way for the removal of the cladding layer in the POF sensing region and for the reduction of the exposed core. At the end, a thin gold film (60 nm thick) can be deposited on the flat hand grinded D-shaped POF core, for exciting SPR resonance at the metal/external medium interface. Despite the straightforwardness of the hand polishing method, described above, in this work we want to compare performances of a hand polished SPR D-shaped POF platform with the ones achieved by a mechanical polishing procedure. Actually, the performances are influenced by small variations in the morphology of the D-shaped region (roughness and total depth) resulting from the manual process used for the preparation of the sensors.

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