Modelling and realisation of PDMS microchannel to integrate in a nanostructured magneto-plasmonic gas and biosensor device

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Microfluidics provides the ability to analyze small sample volumes and reagents, which leads to lower assay costs as well as sample preparation automation. The integration of these existing techniques provides a number of advantages and challenges when combined with an optical detection platform, such as MOSPR (magneto-optical surface Plasmon resonance). In this work a discussion about recent advances in combining biomolecular microarrays, microfluidics and MOSPR biosensing is presented and its advantages are discussed.
Actually, microfluidic technologies are capable of controlling and transferring tiny quantities of liquids which allow chemical and biochemical assays to be integrated and carried out on a small scale. Such technologies provide to manipulate the fluids and improve the mixing or the separation phase or to increase the temperature of the fluid (some reactions needs high temperature) and reduce the time for analysis. The fabrication of microfluidics device is based on standard photolithography techniques for master realization [1,2].
In this work we have developed a single microfluidic channel for application in a magneto-optical surface plasmon resonance device (Fig.1). The typical dimension of the channel are: 100 μm x 30μm x 1,5 cm (width, height, length). Before the realisation of the device the performances of the system has been evaluated by computational simulations with finite elements analysis.

References

[1] T.M. Squires, S.R. Quake, Rev. Mod. Phys., 77, 2005, 977.
[2] G.M. Whitesides, Nature, 422, 2006, 368.

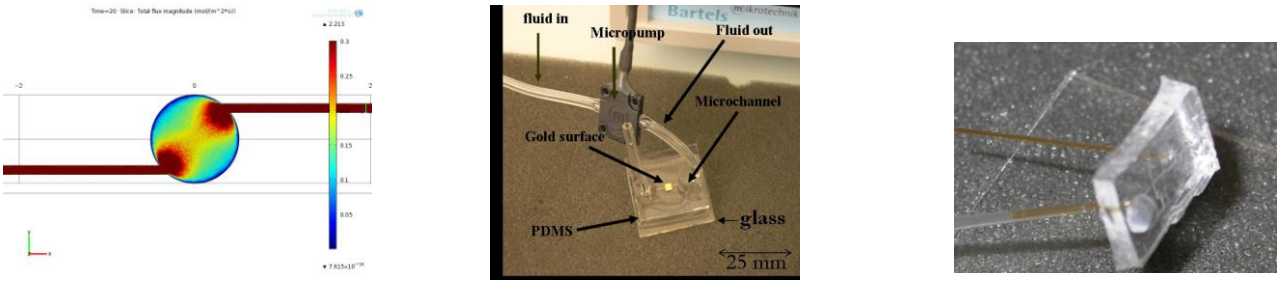

Fig.1: Typical single channel MOSPR microfluidic device