

Title: Biosensing comparison between different geometries based on vertical submicron-structures made of SU-8 resist

Authors and affiliations: FJ Sanza^{1*}, MF Laguna^{1,2}, R Casquel^{1,2}, A Lavin², A López¹, M Holgado^{1,2}

¹Centro Láser Universidad Politécnica de Madrid (CLUPM), Ctra. de Valencia km 7,300, Edificio tecnológico “La Arboleda”, Campus Sur UPM, 28031, Madrid (Spain)

²Departamento de Física Aplicada de la Escuela Técnica Superior de Ingenieros Industriales (ETSII), Universidad Politécnica de Madrid (UPM), C/ José Gutiérrez Abascal, 2, 28006, Madrid (Spain)

*Presenting author: fj.sanza@upm.es

Abstract:

Previous work of the research group [1-4] demonstrated the viability of using periodic lattices of micro and nanopillars, called Bio-photonic sensing Cells (BICELLS), as an optical biosensor vertically characterized by visible spectrometry. Also we have studied theoretically [5] the performance of the BICELLS by 2D and 3D simulation in order to optimize the biosensing response.

In this work we present the fabrication and biosensing comparison of different geometrical parameters on periodic lattices of pillars in order to discuss theoretical conclusions with these results. In this way, we have explored the biosensing response of other patterns such as crosses, stars, cylinders, concentric cylinders (Figure 1).

Also we introduced a novel method to test the BICELLS in a cost-effective way by using an ultra-thin film of SU-8 spin-coated onto the patterns to reproduce the effect of a biofilm attached to the biosensor surface. Finally we have tested the biosensing response of the different geometries by the well-known Bovine Serum Albumin (BSA) immunoassay and compared with the theoretical simulation.

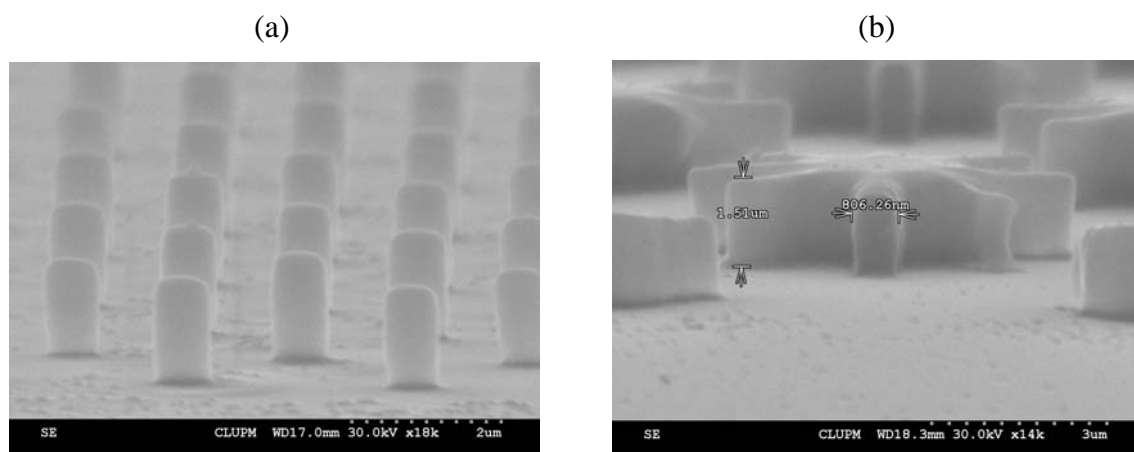


Figure 1. SEM images of periodic hexagonal lattices of (a) submicropillars and (b) microstars made of SU-8 with 1.5 μm in height.

References:

- [1] Holgado et al. “Label-free biosensing by means of periodic lattices of high aspect ratio SU-8 nano-pillars” *Biosensors and Bioelectronics* 25 (2010) 2553-2558
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- [3] Sanza et al. “Bio-Photonic Sensing Cells over transparent substrates for anti-gestronone antibodies sensing” *Biosensors and Bioelectronics*, 26 (2011) 4842-4847
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