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Recent publications:

1. Santos, A.; Balderrama, V.S.; Alba, M.; Formentín, P.; Ferré-Borrull, J.; Pallarès, J.; Marsal, L.F., Nanoporous anodic alumina barcodes: Toward smart optical biosensors, *Advanced Materials*, 24(8), 1050-1054, (2012).

2. Santos, A., Macias, G., Ferré-Borrull, J., Pallarès, J., Marsal, L.F., Photoluminescent enzymatic sensor based on nanoporous anodic alumina, *ACS Applied Materials and Interfaces*, 4, pp. 3584-3588, (2012).

3. Santos, A. Formentín, P. Ferré-Borrull, J. Pallarès, J. Marsal, L.F., Structural engineering of nanoporous anodic alumina funnels with high aspect ratio. *Journal of Electroanalytical Chemistry and Interfacial Electrochemistry*, 655(1), 73-78. (2011).

4. Santos, A., Montero-Moreno, J.M., Bachmann, J., Nielsch, K., Formentín, P., Ferré-Borrull, J., Pallarès, J., Marsal, L.F. Understanding pore rearrangement during mild to hard transition in bilayered porous anodic alumina membranes, *ACS Applied Materials and Interfaces*, 3 (6), pp. 1925-1932, (2011).

5. Santos, A., Ferré-Borrull, J., Pallarès, J., Marsal, L.F., Hierarchical nanoporous anodic alumina templates by asymmetric two-step anodization, *Physica Status Solidi (A) Applications and Materials Science*, 208 (3), pp. 668-674, (2011).

6.- Santos, A.; Vojkuvka, L.; Pallarés, J.; Ferré-Borrull, J.; Marsal, L.F., Cobalt and Nickel Nanopillars on Aluminium Substrates by Direct Current Electrodeposition Process. *Nanoscale Research Letters*, 4(9), 1021-1028, (2009).

7.- Tymczenko, M.; Marsal, L.F.; Trifonov, T.; Rodriguez, I.; Ramiro-Manzano, F.; Pallares, J.; Rodriguez, A.; Alcubilla, R.; Meseguer, F., Colloidal Crystal Wires. *Advanced Materials*, 20(12), 2315-2318, (2008).

8.- Palacios, R.; Formentín, P.; Trifonov, T.; Estrada, M.; Alcubilla, R.; Pallarés, J.; Marsal, L. F., Semiconducting P3HT microstructures: fibres and tubes obtained from macroporous silicon template. *Physica Status Solidi, Rapid Research Letters*, 2(5), 206-208, (2008).

Avances en silico nanomacroporoso y alumina nanoporosa para aplicaciones en biosensado y biotecnología

Advances in nano-macroporous silicon and nanoporous alumina for applications in biosensing and biotechnology

The fabrication of micro and nanostructures based on porous materials has attracted an increasing interest due to their potential applications in research fields such as electronics, photonic, chemistry and so on. Recently, several electrochemical approaches have allowed modifying the original structure of nanoporous anodic materials such as alumina or silicon (i.e. straight and well-defined pores). Many innovative pore architectures such as funnel-like, modulated, serrated-like, hierarchical, three-dimensional, tip-like, etc. have emerged from those techniques. All this brings an excellent opportunity to design and fabricate nanoporous materials with special features for biotechnological purposes as for example: cell culture, molecular separation–adsorption, drug delivery, optical biosensing and so on.

We present several electrochemical approaches for fabricating new structures based on nanoporous anodic alumina and porous silicon, which result from different anodization strategies. In addition, porous structures can be used as hard templates for the fabrication of new micro and nanostructured materials by template wetting method. The infiltration of materials into porous templates, such as polymers, nanoparticles, nanocomposites, etc. allows tailoring structures as inverse replicas of the templates. The fabricated structures are characterized by different microscopical and optical techniques such as scanning electron microscopy (SEM), Atomic Force Microscopy (AFM), photoluminescence (PL), UV-Vis-NIR spectroscopy, spectroscopic ellipsometry, etc. Finally, different examples of applications are presented and discussed.