

Full processing of Colloidal Photonic Crystals by Spin-Coating

Hernán Míguez,* Agustín Mihi, Raúl Pozas, Manuel Ocaña, Gabriel Lozano
Instituto de Ciencia de Materiales de Sevilla, Consejo Superior de Investigaciones Científicas, Américo Vespucio s/n, 41092 Sevilla, Spain

Herein we will show how to use spin coating, a technique widely employed in current optoelectronics technology, to fully process colloidal photonic crystals. We will demonstrate that control over every stage of the lattice growth and post-treatment is achievable by using this technique. Crystallization,(1) guest material infiltration,(2) and controlled introduction of defects(3) have been achieved in time windows that range from a few seconds to minutes, implying a giant step forwards in terms of the feasibility of such materials. The optical quality of crystals, inverse lattices attained from them, or dopants is comparable or better than the quality realized by other methods. Besides, large surfaces are covered with an non-precedent uniformity. A detailed study of the dependence of the lattice features on the spin coating relevant parameters such as the spinning velocity and the characteristics of the precursor suspension (concentration, dispersants, aging) will be presented.

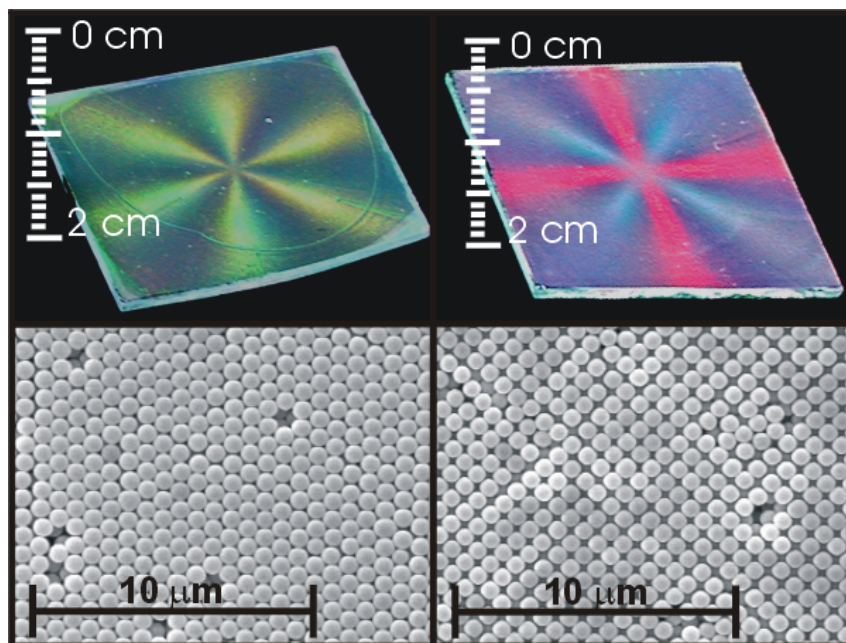


Figure 1. Optical (top) and electronic micrographs of the different colloidal lattices attained by spin coating.

- [1] A. Mihi, M. Ocaña, H. Míguez, *Advanced Materials*, **18**, 2244 (2006).
- [2] L. Villaescusa, A. Mihi, I. Rodríguez, A.E. García-Bennet, H. Míguez, *J. Phys. Chem. B* **109**, 19643 (2005).
- [3] R. Pozas, A. Mihi, M. Ocaña. H. Míguez, *Advanced Materials*, **18**, 1183 (2006).