

## **Photonic crystals obtained by physical and chemical templating**

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Infiltration of opals with host materials, a technique known as templating, is a powerful tool to provide additional functionality to bare opals. Typically synthesis in the interior of the pores is employed. This can be used to produce several morphologies, conformal growth standing out for its quality and can be also combined with physical methods where the guest material is introduced rather than synthesized in situ.

A chemical method is shown for the synthesis of silicon in the interior of polymeric self-assembled microstructures [1]. By combining silica and silicon CVD processes it is possible to build up multilayered structures arranged in 3D with photonic crystal optical response.

A novel composite integrating two materials such as ZnO and semiconductor colloidal CdTe quantum dots in a photonic crystal (inverted opal) is fabricated by physical infiltration in two hierarchical steps of colloidal self-assembly[2]. This system provides a means to study the effect of a high energy photonic gap (sustained by the ZnO matrix) on the QDs spontaneous emission.

[1] A. Blanco and C. López, *Adv. Mater.* 18, 1593–1597 (2006)

[2] P. D. García, et al., *Adv. Mater.* 18, 2768-2772 (2006)