Conformal Growth of Organic Luminescent Planar Defects within Artificial Opals

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Herein, we present the result of combining, for the first time, the techniques of colloidal selfassembly and plasma-enhanced chemical vapor deposition to create a novel, high-quality, purely organic active photonic crystal structure of controlled optical properties. We show a fast, reliable, and accurate procedure to introduce two-dimensional luminescent organic defect layers within artificial polystyrene opals via a versatile room-temperature remote plasma deposition process. This method is gentle enough to allow highly conformal growth on polystyrene microspheres without altering their morphology or the ordered arrangement that they form. The luminescent organic layer behaves both as an optical dopant, causing the opening of transmission windows within the forbidden frequency interval of the lattice, and as an optically active material, whose emission can be tailored by the photonic environment.

References:

[1] F.J. Aparicio, G. Lozano, et al., Chem. Mater., **2** (2010) 379.