

## **From Photonic Crystals to Photonic Glasses through disorder**

P. D. García, R. Sapienza, A. Blanco and, C. López  
Instituto de Ciencia de Materiales de Madrid (CSIC)  
C/ Sor Juana Inés de la Cruz 3, 28049 Madrid, Spain

Defects in photonic crystals are often regarded as undesirable features that spoil optical quality and performance. They can however be used to realize cavities, waveguides etc. in what can be categorized as heterostructures. In this case a strict control on defects amount, position, shape, and other morphological characteristics is needed. In self-assembled photonic crystals the introduction of defects is partly out of the control of the synthesizer and the achievement of the highest quality possible is a common goal of the colloidal community. Contrary to intuition the introduction of arbitrarily high amounts of disorder is, in some cases, an equally difficult task but the resulting material presents intriguing new optical properties.

In this contribution a study is presented where opals are synthesized with the aim of building totally disordered structures out of monodisperse microspheres. Several approaches are tested such as fast centrifugation, rapid evaporation, colloid mixing etc. To measure the amount of order remaining, optical tests are conducted where reflectance and transmittance are measured. When the material composing the colloidal particles is transparent the magnitude  $R+T$  can be used as a good measure of the order. Initial characterization of optical properties originating from the peculiar structure is presented.