

Nano-scale shaping of colloidal building blocks in photonic crystals

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Close packings of a number of colloidal particles has been studied due to its unusual optical properties or highly efficient mass transfer when it is used as catalytic support. In particular, controlling the light with these materials always require the precision in their periodic positions and size uniformity of building blocks at nanometer scale. Therefore, any additional process in photonic crystals should be nano-fabrication, of which uncertainty would be one billionth meter. In this presentation, we will demonstrate the use of dry etching as the highly precise nanofabrication tool for isotropic shaping colloidal building blocks in self-assembled photonic crystals and controlled stretching or squeezing techniques of composites of polymer microspheres and silicone rubber for inherent anisotropic deformation of colloidal building blocks. In both case, we have controlled shapes of polymeric microspheres in their close-packed structures keeping the lattice constants, which have caused change of their optical property precisely.