

Optofluidic Fabrication of Photonic Balls with Isotropic Colors

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Photonic crystals have a periodic modulation of refractive index in wavelength scale of interacting light, which induces photonic bandgaps. Photonic bandgaps are of practical significance for wide range of applications such as structural color pigments, bio/chemical sensors and optical resonators. In the present work, we report optofluidic preparation of colloidal photonic crystals in spherical symmetry (or photonic balls) with emulsion molding. The colloidal particles dispersed in photocurable resin organized into the face-centered cubic (fcc) structure spontaneously on account for their repulsive interparticle potential. Especially, photonic balls shows isotropic structural colors unlike conventional film type photonic crystals because the (111) plane of fcc was generated over the entire free interface of the emulsion droplets. We expect that the photonic balls will be useful for structural color pigments in microdisplay and biological screening systems.