Fabrication of Inverse-Opaline Photonic Crystal Microparticles using Photolithography and Embedded Silica Particles into Polymer Films

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Recently, the suspension arrasys are attracting great interests in the field of drug discovery. Direct signal processing such as spectrum analysis is well-used encoding approach, due to its simplicity and accuracy both in encoding and decoding. Photonic crystals have been proposed as a new type of spectrum encoding carrier, whose code is the distinctive reflection peak originated from the photonic stop-band. We report here a novel and versatile method that can fabricate the inverse-opaline photonic crystal microparticles for suspension arrays. For generation of inverse-opaline photonic crystal, we used the self-assembly of silica particles on the photoresist flims, the embedding of them into the films, and the photolithographic process. By changing the diameters of silica particles, the various inverse-opaline photonic crystal microparticles with different colors were obtained. In addition, the biomolecules could be immobilized by surface modification of inverse-opaline microparticles. Therefore, the detection of multiple analytes could be realized by analysis of their wavelength-dependent reflectance properties.