

Pixellation of Photonic Crystal Films for RGBW Display

이수연^{1,2}, 김신현³, 황혜림^{1,2}, 양승만^{1,2,*}

¹한국과학기술원 생명화학공학과;

²한국과학기술원 광자유체집적소자연구단;

³Harvard University

(smyang@kaist.ac.kr*)

Recently, the fabrication of patterned structures using self-assembled colloidal crystals has attracted great interests for photonic-crystals-based microdisplay devices, integrated photonic chips, as well as micro-cavities for adding or extracting the light of certain frequency. We report a simple and novel strategy based on conventional photolithography for patterning inverse opaline photonic crystals, which is essential for practical applications. After fabrication of square patterns by one patterning, the spin-coating of SU-8, different sized silica particles deposition, and embedding of silica spheres were successively performed. By triple repeated and elaborate patterning method using silica particles of three different sizes and mask aligner, we could create the pixellated photonic crystals with multicolor patterns. Red (R), green (G), and blue (B) square patterns were precisely arranged in regular patterned pixels without the overlapping of neighboring squares. The normal incidence superimposed reflectance spectrum of the pixellated multicolor inverse opal patterns showed three distinct peaks, which originated from the photonic bandgaps.