Photonic Microdisk as a Color Pigment for Reflective Color Display

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Colloidal crystals are promising materials as color pigments for display devices due to their unique optical properties. However, conventional approaches such as Janus photonic balls under an electric field have limitations; low reflectivity and low color contrast owing to spherical symmetry of the balls and low crystallinity of colloids. In this work, we report a simple method to fabricate tri-layered photonic microdisks 200μm in diameter composed of first and third layers for photonic crystals, and middle layer for magneto-response. The silica particles are spontaneously crystallized owing to repulsive potential and solidification is easily conducted through photo-polymerization. The resultant colloidal photonic crystals are highly transparent, enabling the production of tri-layered photonic microdisks without complicate procedures. These photonic microdisks are employed as color pigments for reflective color display; each layer has different color and middle layer can flip whole disk particles under magnetic field.