Microfluidic Synthesis of Magneto-responsive Janus Colloidal Photonic Crystals

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Microparticles with magnetic functionalities have been increasingly interested due to their potential applications and remote manipulation. Recently, colloidal photonic crystals including magnetic particles were usually fabricated to have specific photonic bandgap via controlling the intensity of magnetic field. In this work, colloidal microparticles with two different photonic bandgap could be synthesized using microfluidic device. The hemispherical microfluidic channels were fabricated by conventional photolithography and PDMS molding. Then, two hemispherical channels were attached to make cylindrical channel. When fluids were introduced into each channel, two laminar flows could be formed. Janus colloidal microparticles with different photonic bandgap could be synthesized by introduction of two different photocurable silica suspension including magnetic particles and subsequent UV exposure under magnetic field. Due to aligned magnetic particles, microparticles could be rotated under magnetic field. For this reason, reflection colors could be changed by rotation of magnet.