

Supporting Information

Vivid Colours in Hyperuniform Complex-Index Photonic Structures by Resonant Interference of Photonic Band Gaps and Optical Band Gaps

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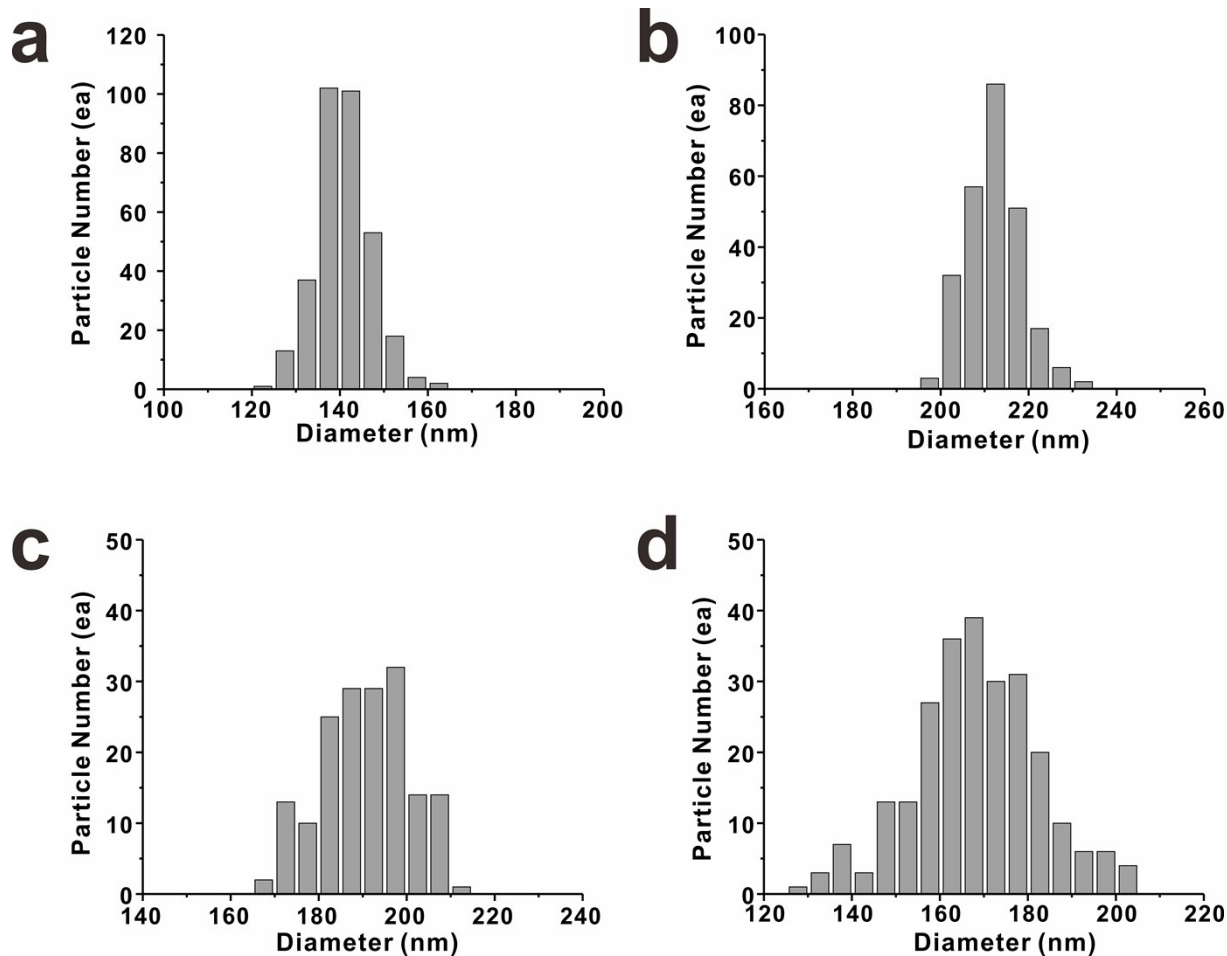


Figure S1. Histograms of nanoparticles used for preparing HPSs and dopants. Polydispersity index (PDI) of particles is defined as $PDI = \langle d^2 \rangle / \langle d \rangle^2$. a) SiO₂ nanoparticles ($d_{SiO_2} = 141 \pm 6$ nm, PD = 1.002), b) SiO₂ nanoparticles ($d_{SiO_2} = 212 \pm 6$ nm, PDI = 1.0009), c) PS_{SD-I} and PS_{SDB-II} ($d = 190 \pm 10$ nm, 1.0002) and d) PDA nanoparticles ($d_{PDA} = 172 \pm 16$ nm, PDI = 1.009).

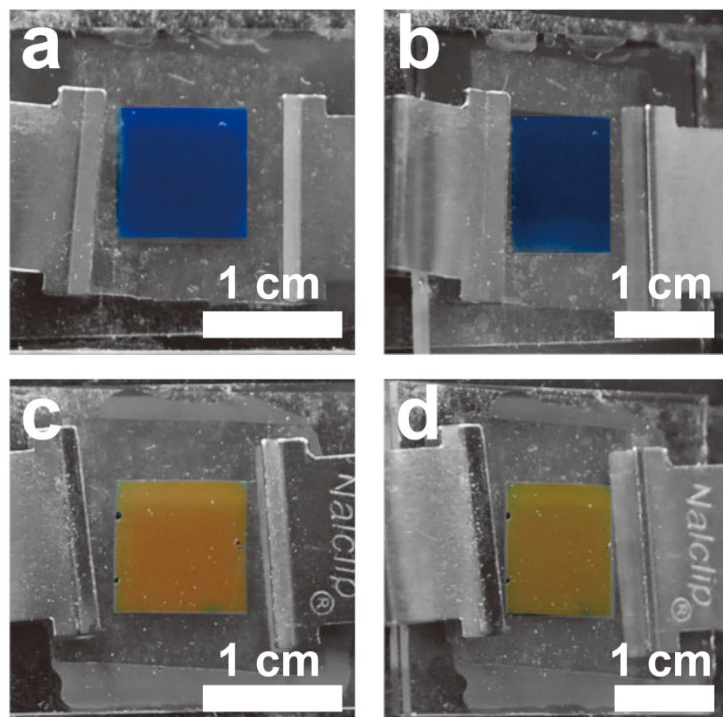


Figure S2. HPSs doped with PDA showing angle-independent photonic colors. Photo images of blue HPS ($d = 159 \pm 9$ nm) at a) normal angle and b) 60° . Photo images of red HPS ($d = 199 \pm 9$ nm) at a) normal angle and b) 60° .

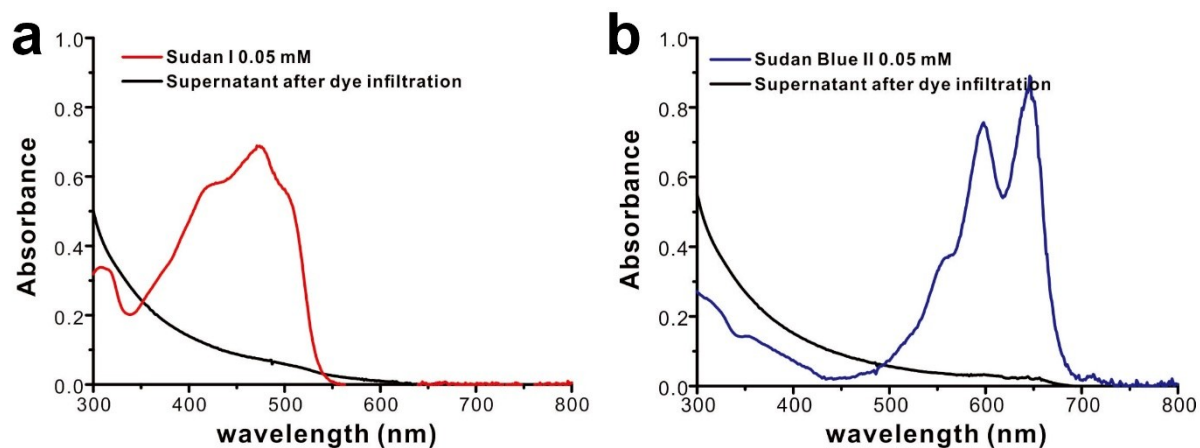


Figure S3. UV-Vis spectra of before and after dye-infiltration in PS nanoparticles. Based on the absorbance changes, the concentrations of Sudan I and Sudan blue II infiltrated in PS nanoparticles were calculated

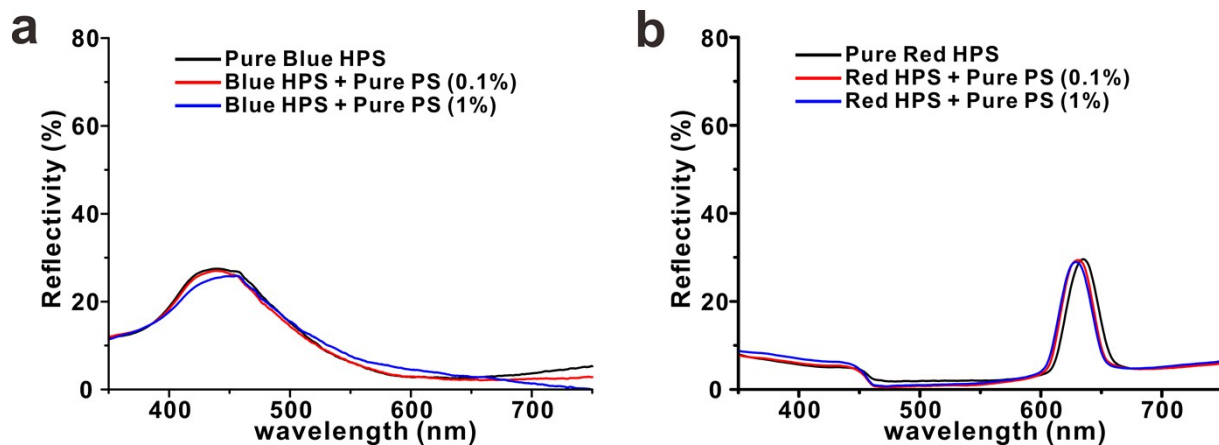


Figure S4. Effects of doping HPS with pure PS nanoparticles. Unlike HPSs doped with dye-infiltrated PS nanoparticles, both blue and red HPSs didn't show reflectivity change at all when pure PS nanoparticles were used as dopants.

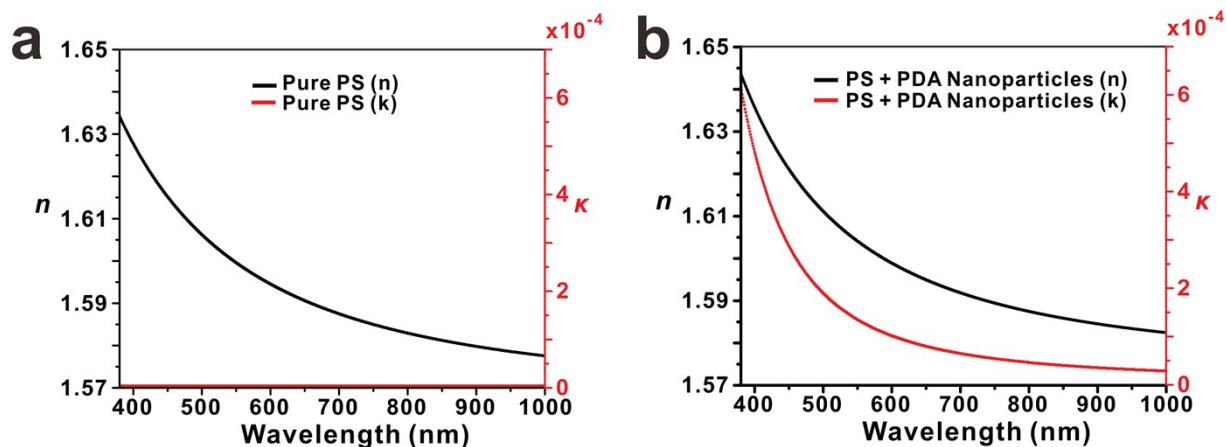


Figure S5. Complex refractive index of a) polystyrene film, and b) PDA nanoparticles embedded in polystyrene films. When PDA nanoparticles were added by 1 wt% to the polystyrene, there was no significant change in the real part of the refractive index of polystyrene. This result shows that doping with a small amount of complex refractive index materials does not affect the real part of the refractive index.

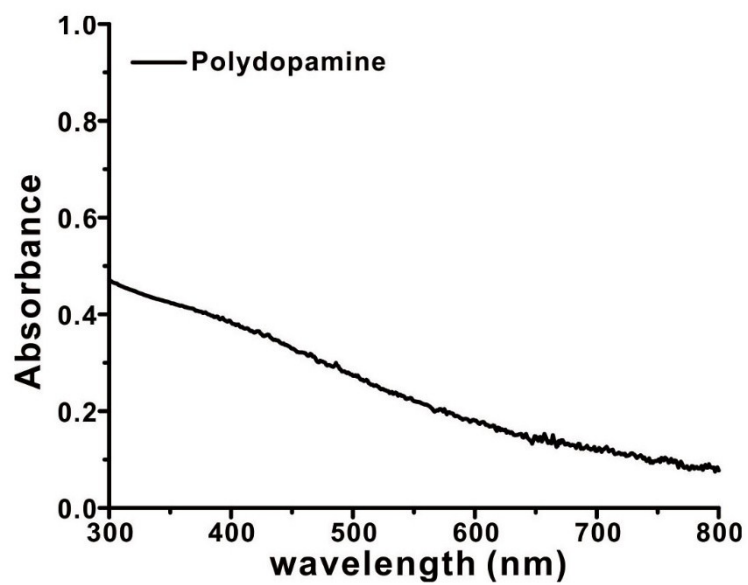


Figure S6. Absorbance spectrum of a colloidal PDA nanoparticle solution.