Supplementary Information (SI) for Journal of Materials Chemistry C.

Electronic Supplementary Information

for

Novel Plasmonic-Photonic Janus Film with Aluminum Nanoisland-Coated Colloidal Arrays for Versatile Applications

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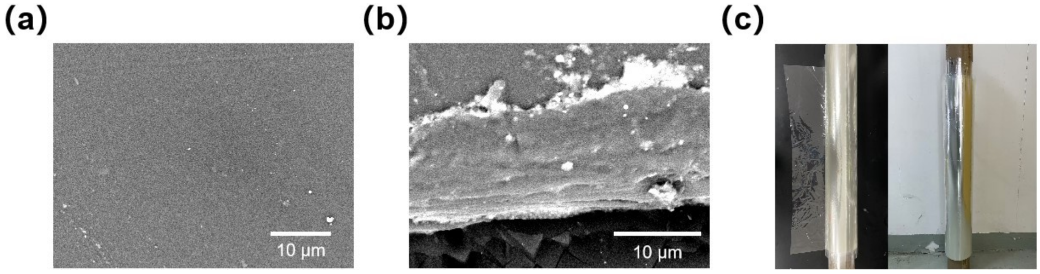

Fig. S1 (a) Top-view, (b) cross-sectional SEM images and (c) photographs of the PET films (thickness: ~13 μm).

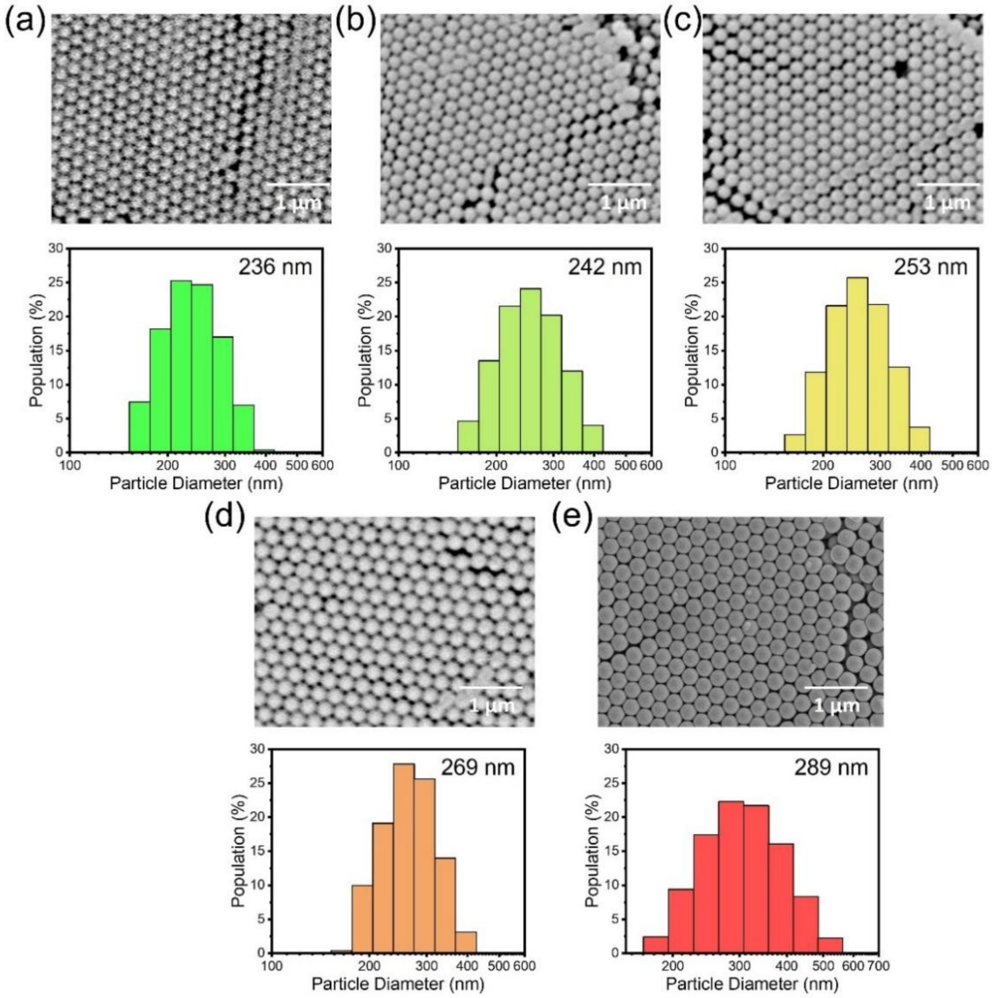

Fig. S2 SEM images and corresponding particle size distribution of the P(St-MMA-AA) nanospheres with different sizes. (a) 236 nm; (b) 242 nm; (c) 253 nm; (d) 269 nm; (e) 289 nm.

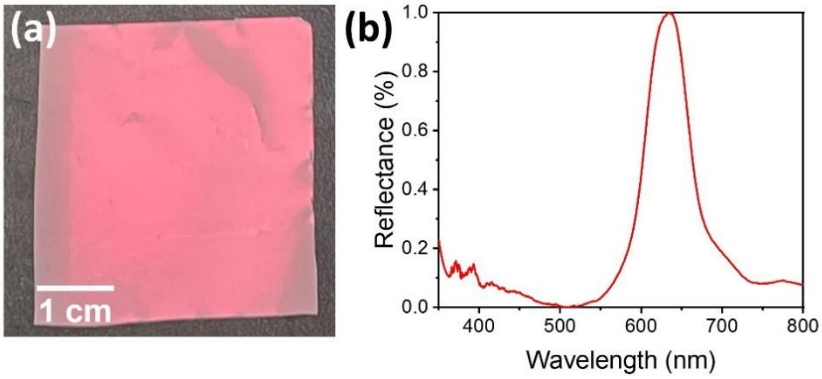

Fig. S3 Photograph and corresponding reflection spectrum of the red P(St-MMA-AA)-based CPC template.

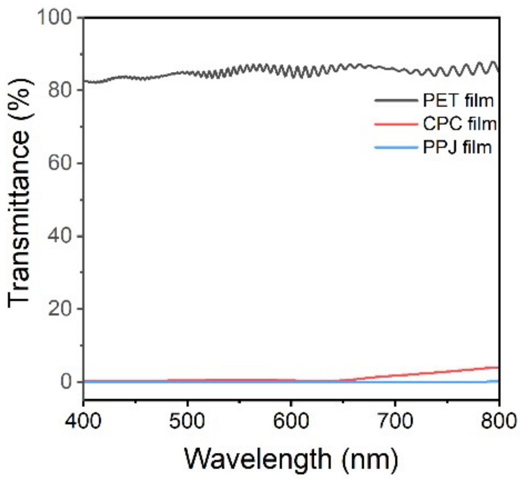

Fig. S4 Transmittance spectra of the PET, CPC and PPJ films, respectively.

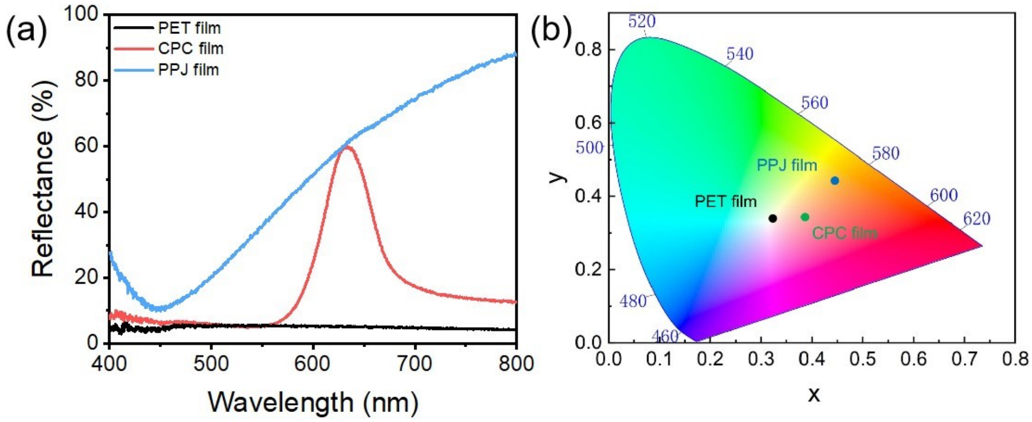

Fig. S5 (a) Reflectance spectra of the PET, CPC and PPJ films and corresponding (b) Commission Internationale de L'Eclairage (CIE) chromaticity diagram.

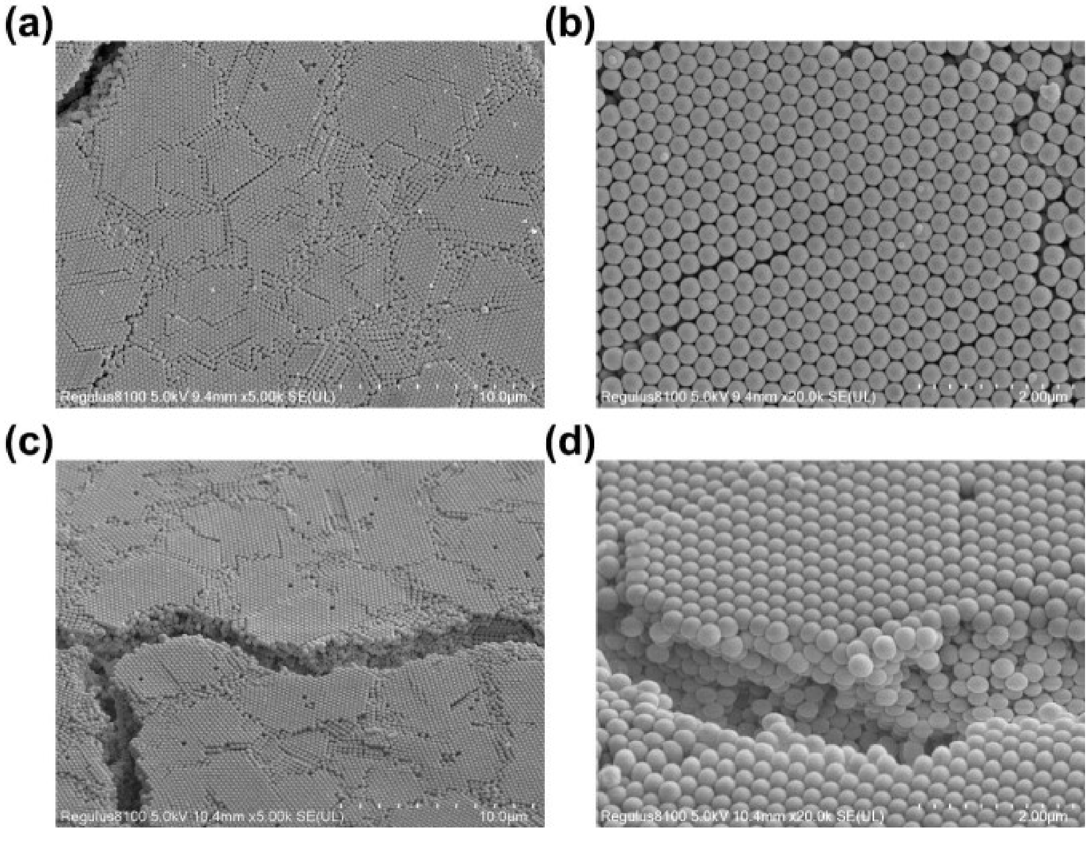

Fig. S6 (a-b) Top-view and (c-d) cross-sectional SEM images of the CPC films.

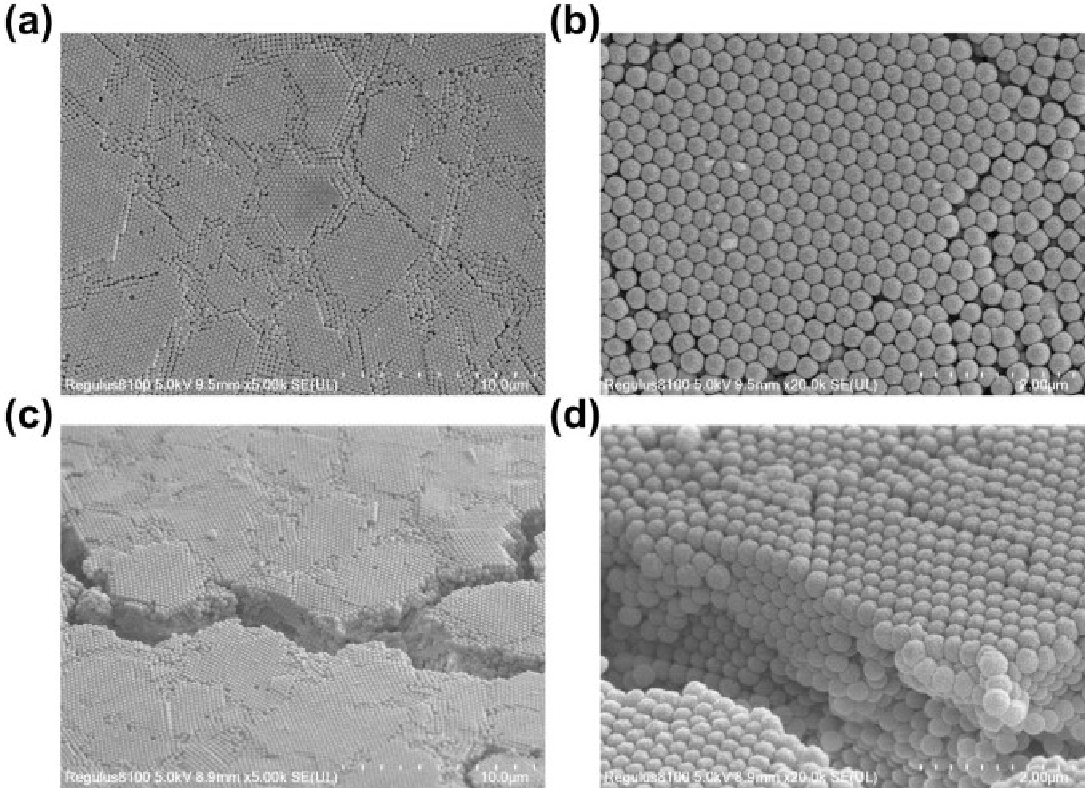

Fig. S7 (a-b) Top-view and (c-d) cross-sectional SEM images of the PPJ films with the Al sputtering times of 60 s.

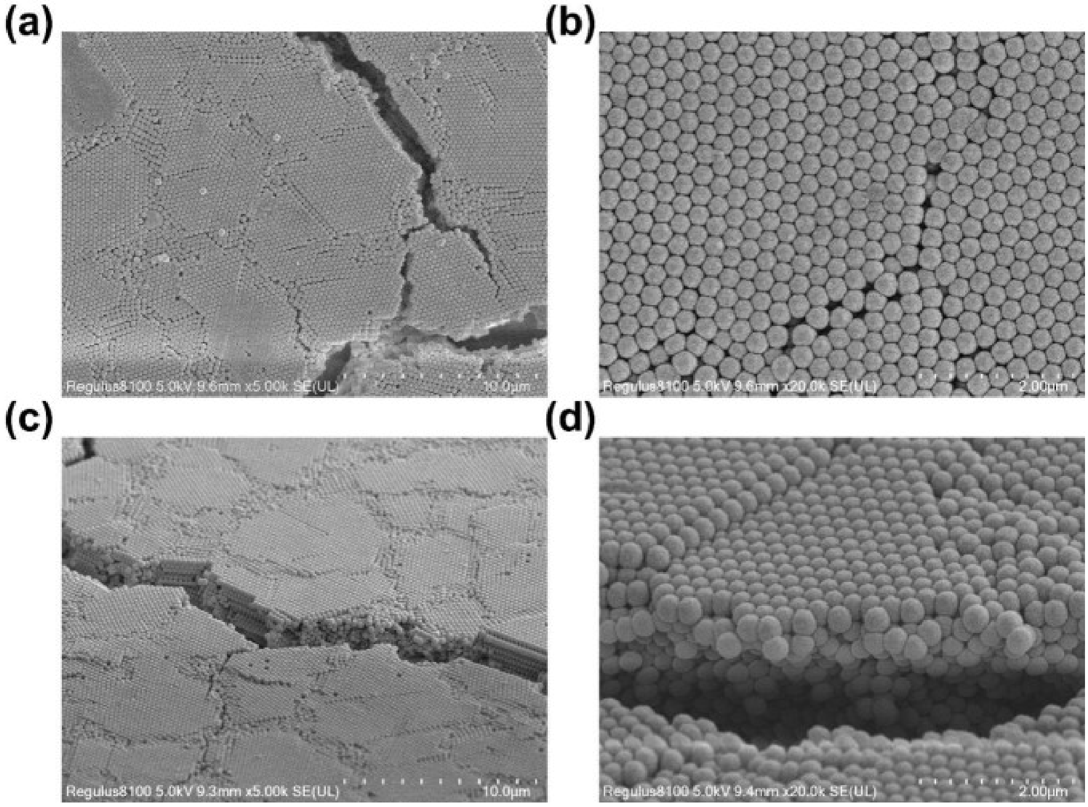

Fig. S8 (a-b) Top-view and (c-d) cross-sectional SEM images of the PPJ films with the Al sputtering times of 120 s.

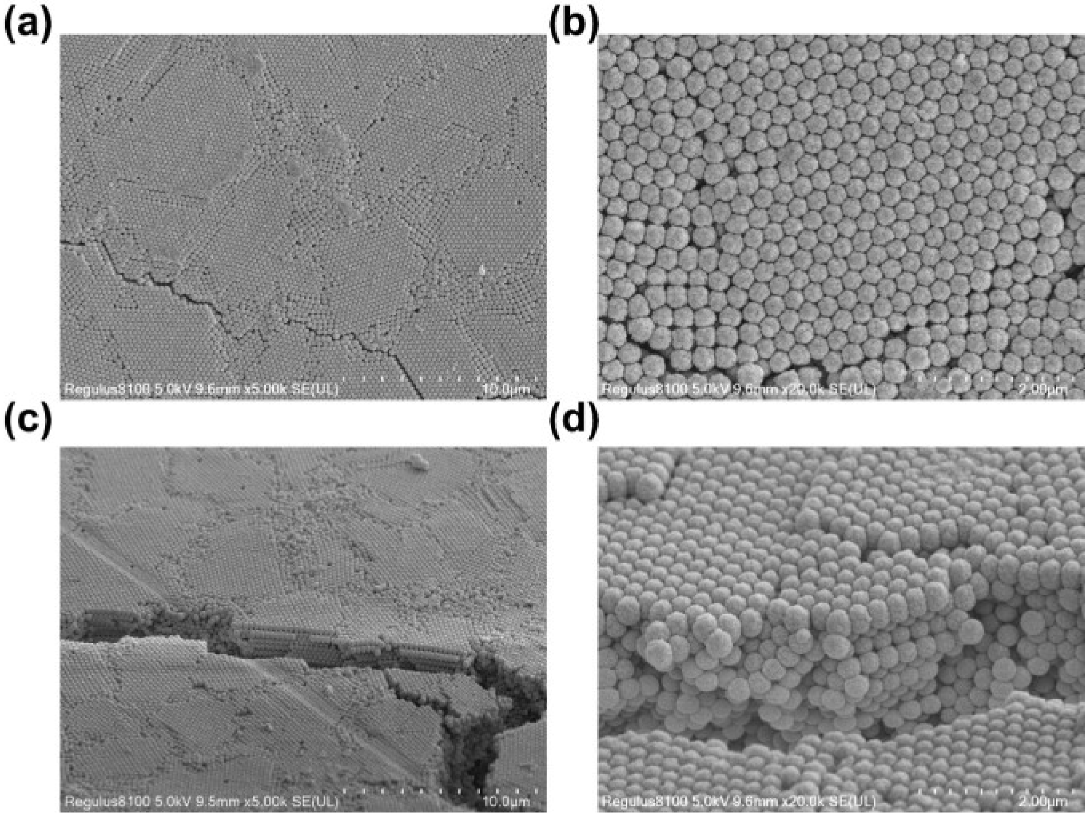

Fig. S9 (a-b) Top-view and (c-d) cross-sectional SEM images of the PPJ films with the Al sputtering times of 180 s.

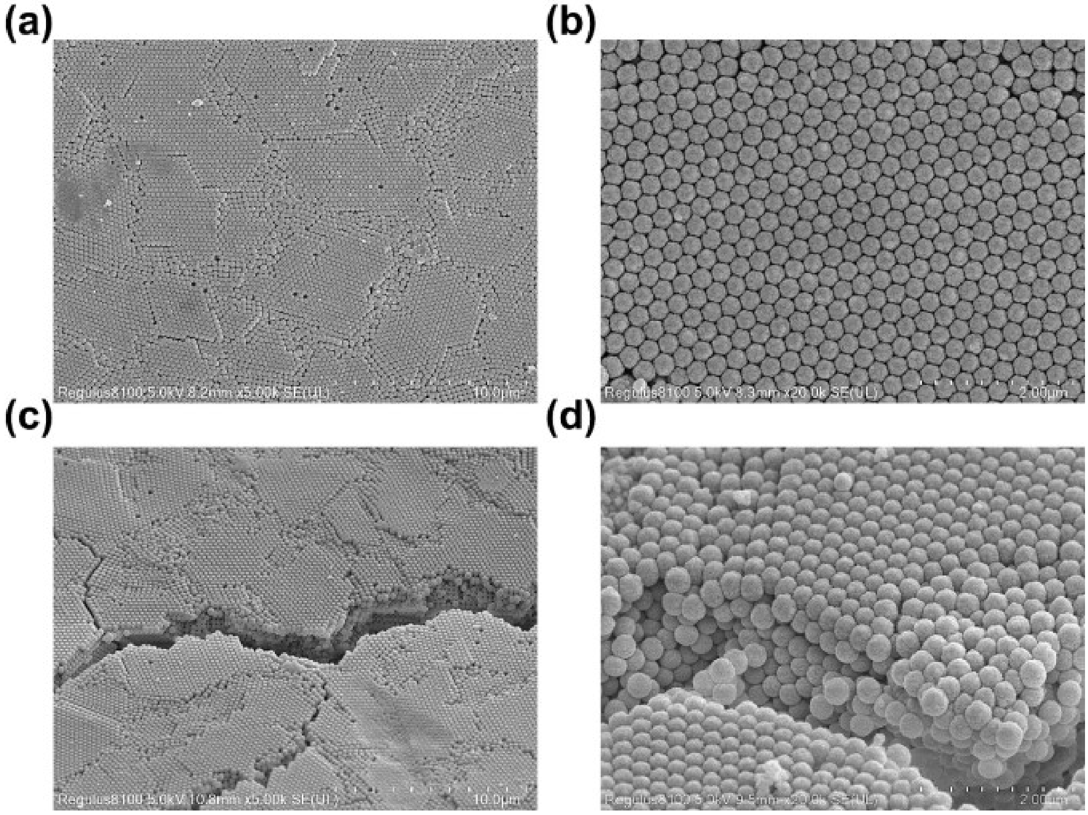

Fig. S10 (a-b) Top-view and (c-d) cross-sectional SEM images of the PPJ films with the Al sputtering times of 240 s.

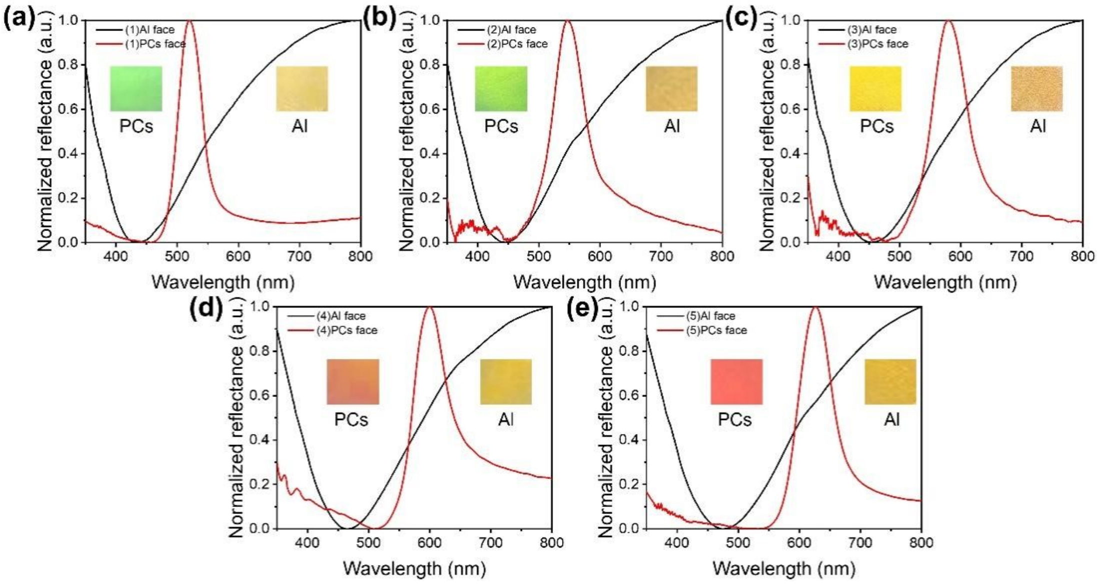

Fig. S11 Reflection spectra and corresponding photographs of the PPJ films at front and back sides with different periodicity of CPC templates (sputtering time: 180s). (a) 236 nm; (b) 242 nm; (c) 253 nm; (d) 269 nm; (e) 289 nm.

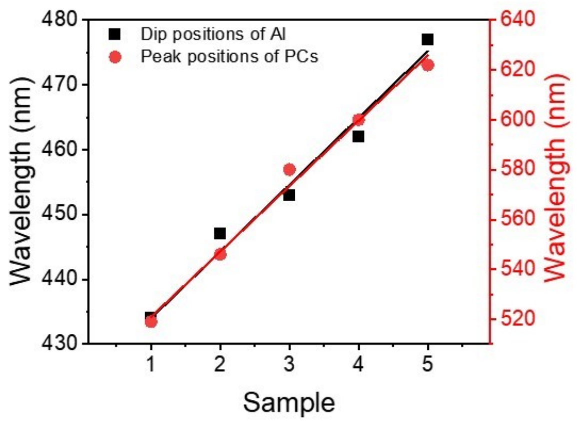

Fig. S12 Relationship between the dip position and the reflection peak of CPC templates derived from Fig. S11.

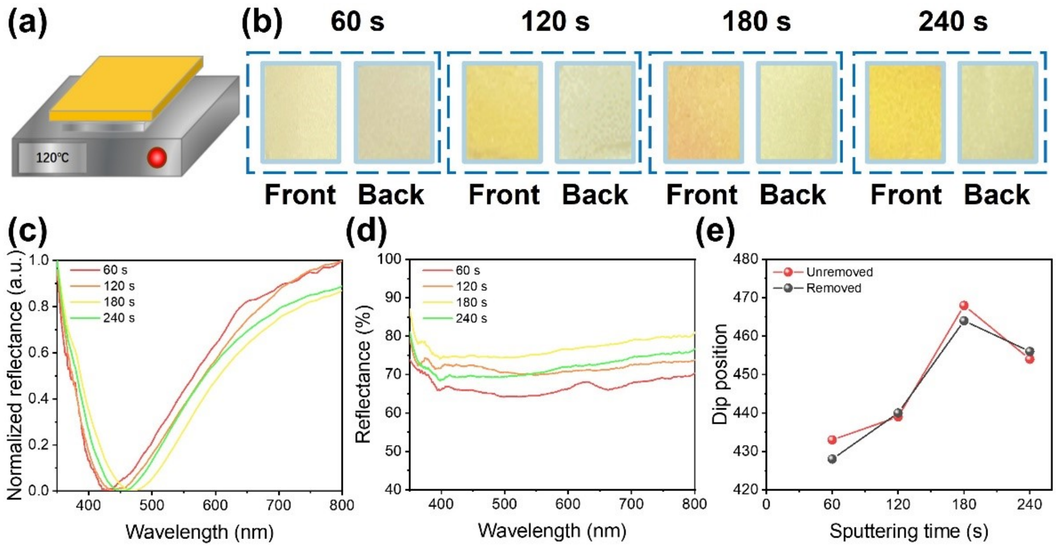

Fig. S13 (a) Schematic illustration showing the process of the CPC template of the PPJ film being destroyed at high temperatures. (b) Photographs and (c-d) corresponding reflection spectra of the PPJ films at front and back sides after removing CPC template. (e) Comparison of the dip position of PPJ films before and after CPC template removal. It can be seen that the dip position remained nearly unchanged during this process, indicating that the Al nanoislands were well preserved after removing CPC template.

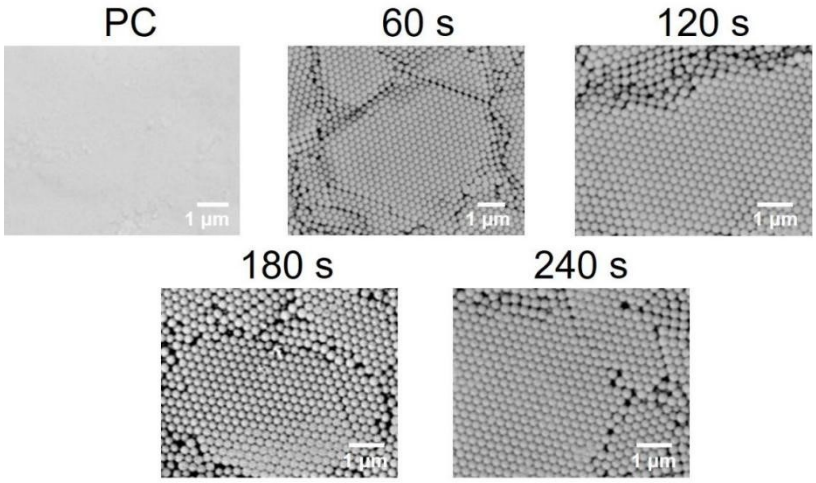

Fig. S14 Top-view SEM images of the pure CPC template and PPJ films with different AlNPs sputtering time after thermal treatment. In comparison with that of pure CPC template, PPJ films still possessed 2D periodically hemispherical structures due to the preservation of Al nanoislands in this process.

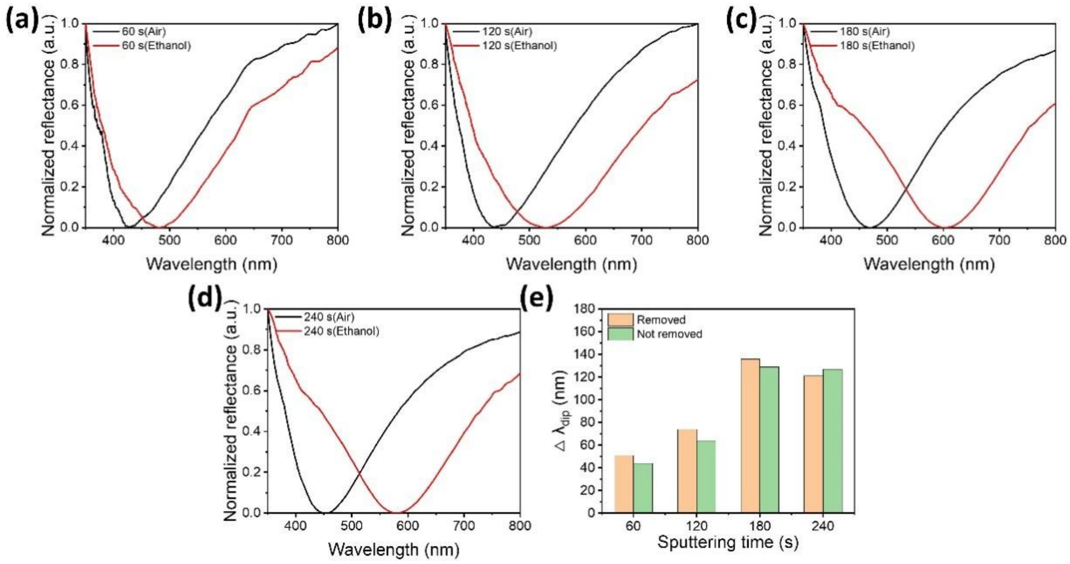

Fig. S15 Reflection spectra of the PPJ films after removing CPC templates with different AlNPs sputtering time before and after ethanol infiltration. (a) 60 s; (b) 120 s; (c) 180 s and (d) 240 s. (e) Comparison of the $\Delta\lambda_{dip}$ of PPJ films before and after CPC removal during solvent response process.

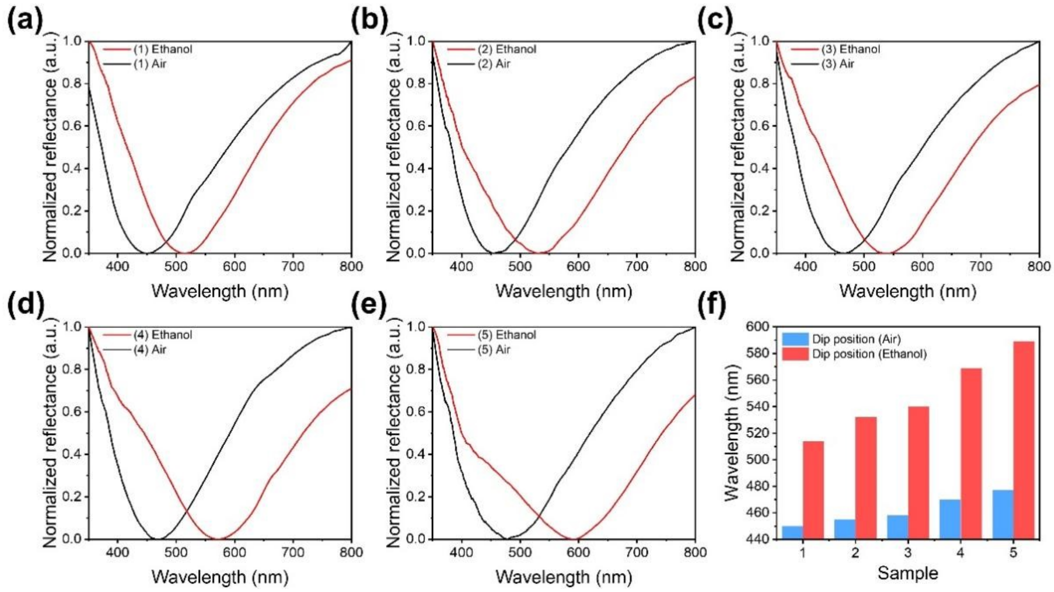

Fig. S16 Reflection spectra of the PPJ films with different periodicity of CPC templates before and after ethanol infiltration (sputtering time: 180s). (a) 236 nm; (b) 242 nm; (c) 253 nm; (d) 269 nm; (e) 289 nm. (f) Summary of the $\Delta\lambda_{dip}$ in solvent response process derived from (a-e).

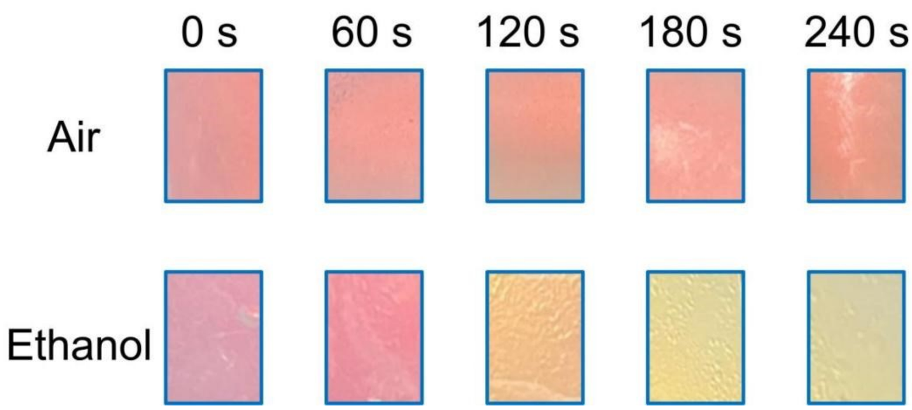

Fig. S17 Photographs of the backsides of PPJ films with different Al sputtering times during solvent response. It can be seen that the color of PPJ films redshifted and become transparent owing to the increase in effective refractive index. Meanwhile, the front side of the golden plasmonic colors dominated the appearance of the PPJ films with the increase of AlNPs sputtering time.

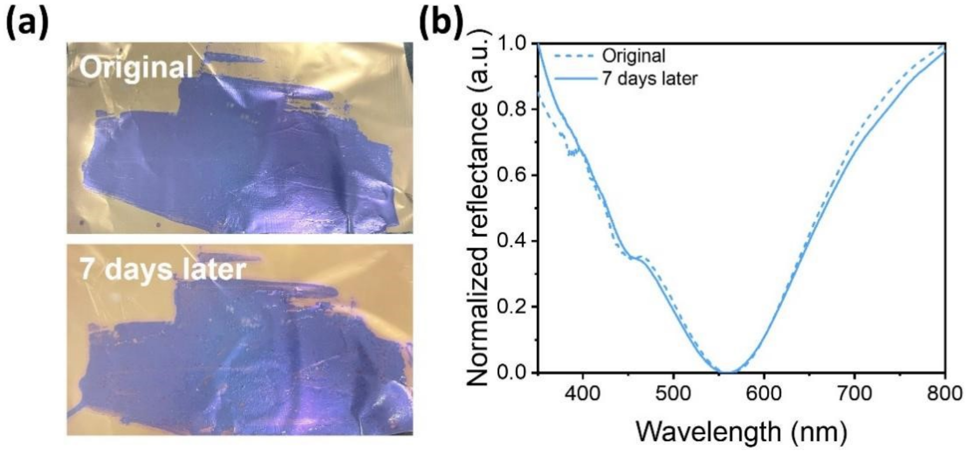

Fig. S18 Photographs and corresponding reflection spectra of the PPJ film after infiltrating glucose molecules for 7 days.

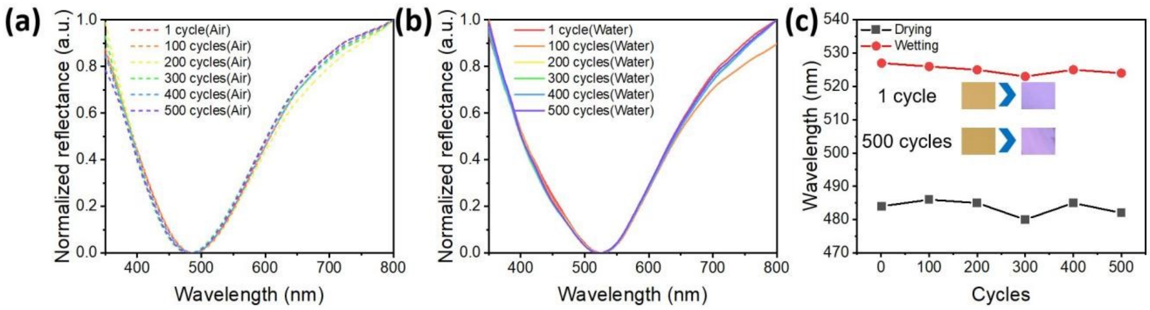

Fig. S19 (a-b) Series of reflection spectra of PPJ films with different cycles before and after water infiltration. (c) Cyclic stability of the λ_{dip} change of the film during wetting/drying.