

## *Supporting Information*

# **An Angle-Independent Multi-Color Display Electro-Responsive Hydrogel Film**

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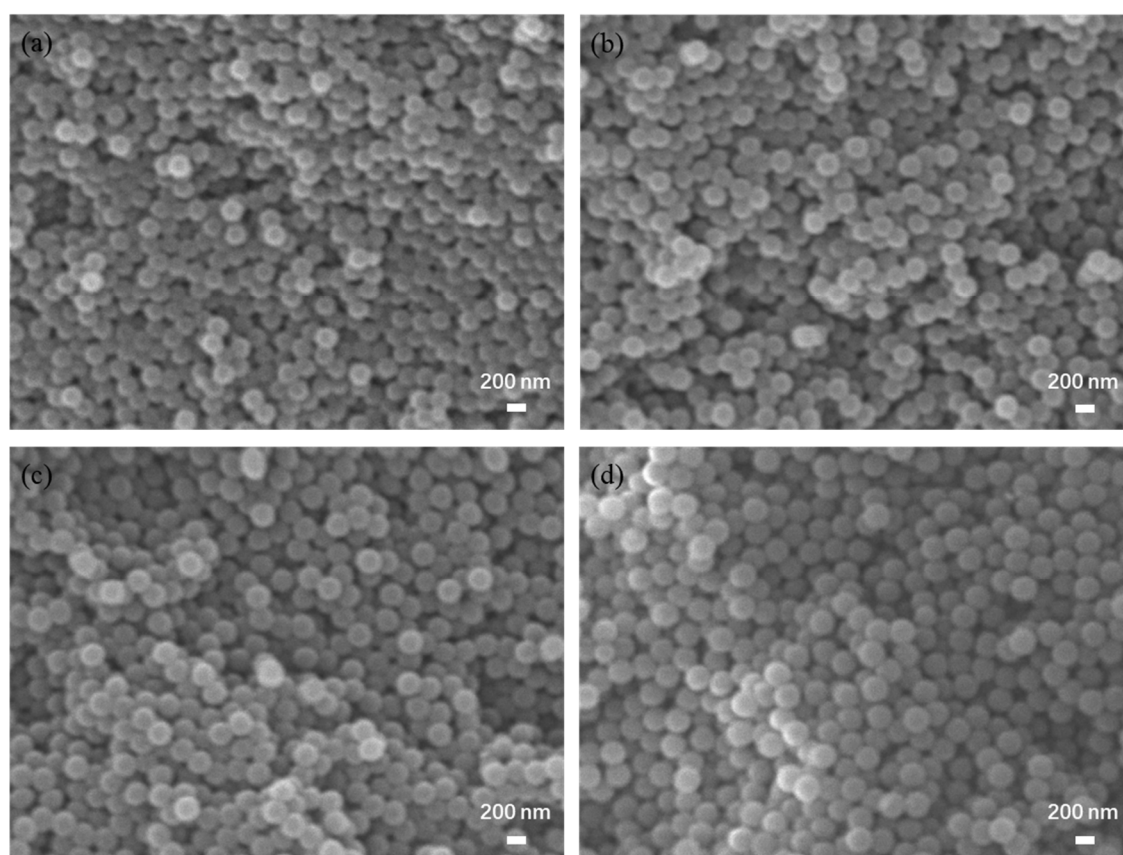
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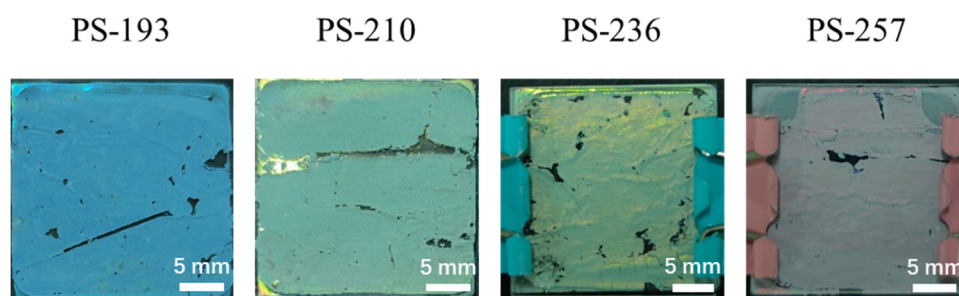
† These authors contributed equally to this work.

**Table S1.** emulsifier SDS dosage and PS particle size

NO.	SDS dosage (mg)	particle size (nm)	Reflective peak wavelength (nm)
1	80.8	193	487.51
2	70	210	522.53
3	67.5	236	571.1
4	59.1	257	640.52

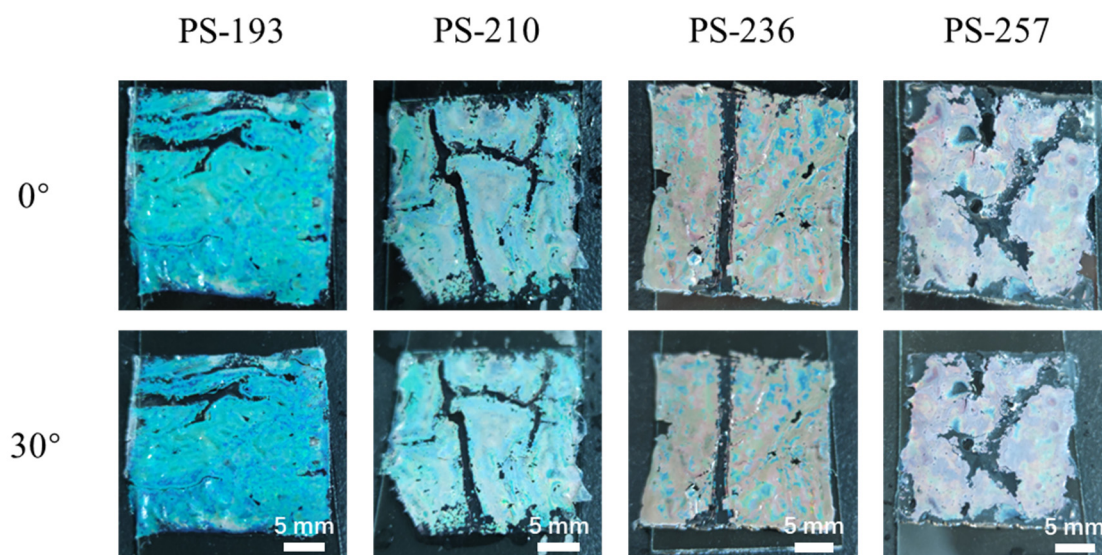


**Figure S1.** SEM images of templates assembled from PS microspheres doped with trace conductive carbon black by micro disturbance of double-sided copy paper cover. The particle sizes of the PS microspheres are (a) 193 nm, (b) 210 nm, (c) 236 nm and (d) 257 nm.

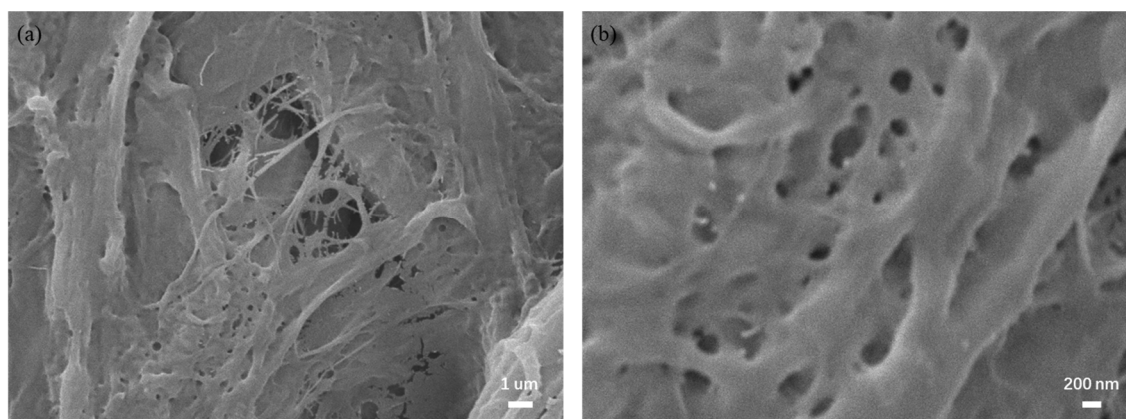


**Figure S2.** Optical photos of templates assembled from different particle sizes PS

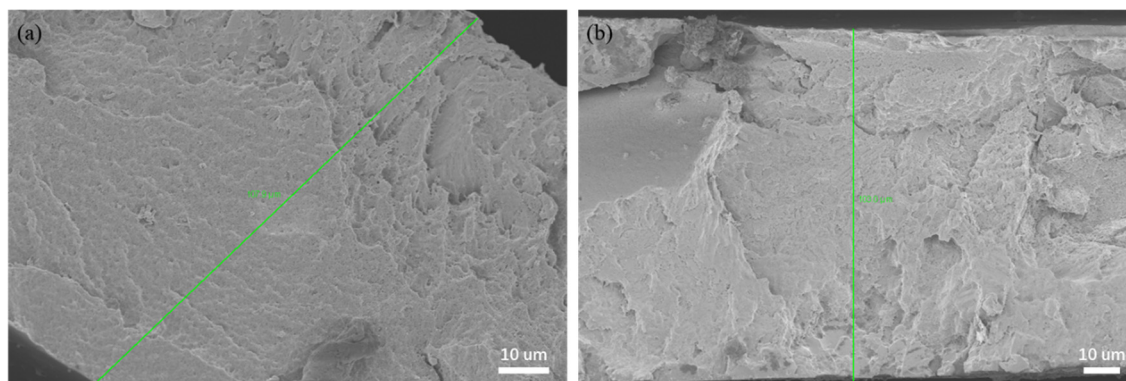
microspheres doped with trace conductive carbon black by micro disturbance of double-sided copy paper cover.



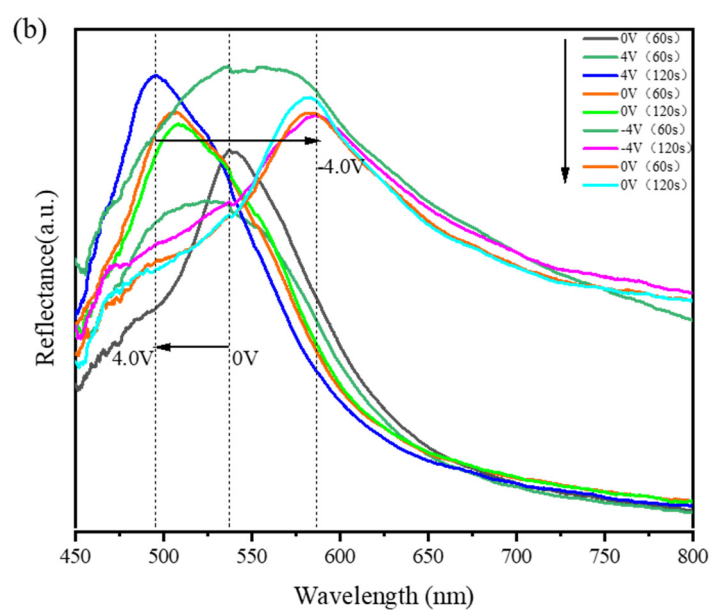
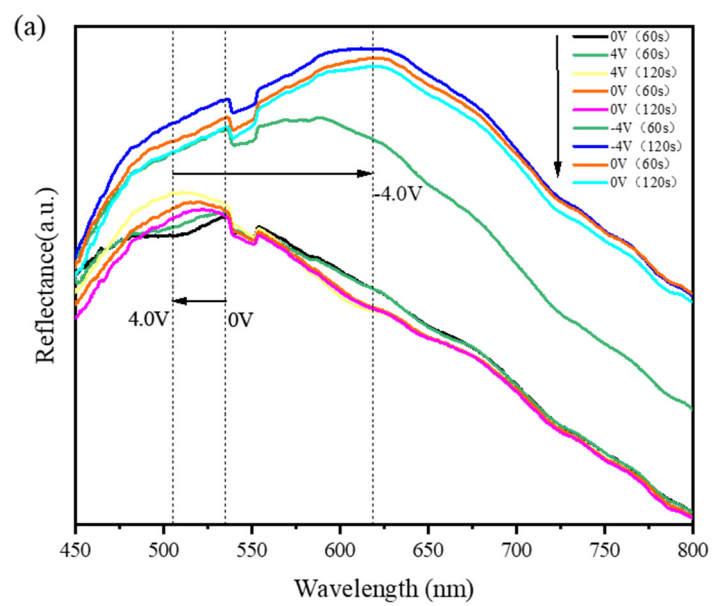
**Figure S3.** Optical photos of disordered AA-IOPG based on disordered templates assembled from different particle sizes PS microspheres doped with trace conductive carbon black by micro disturbance of double-sided copy paper cover (vertically and tilt 30°).

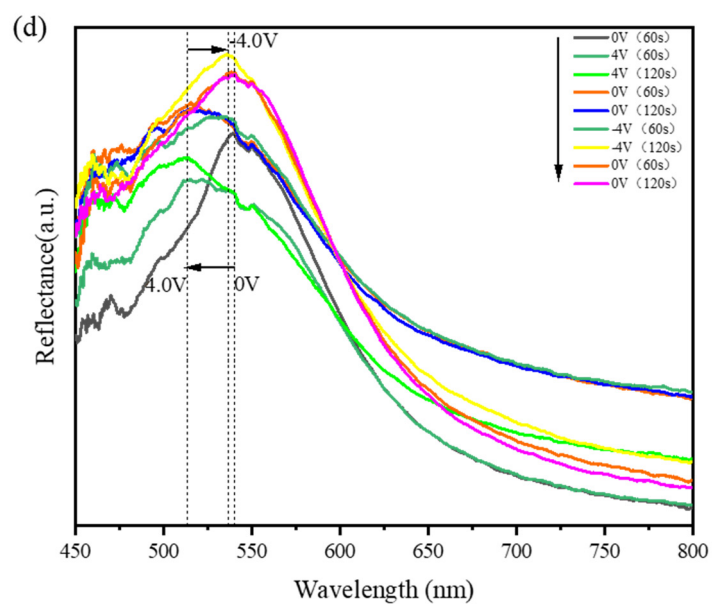
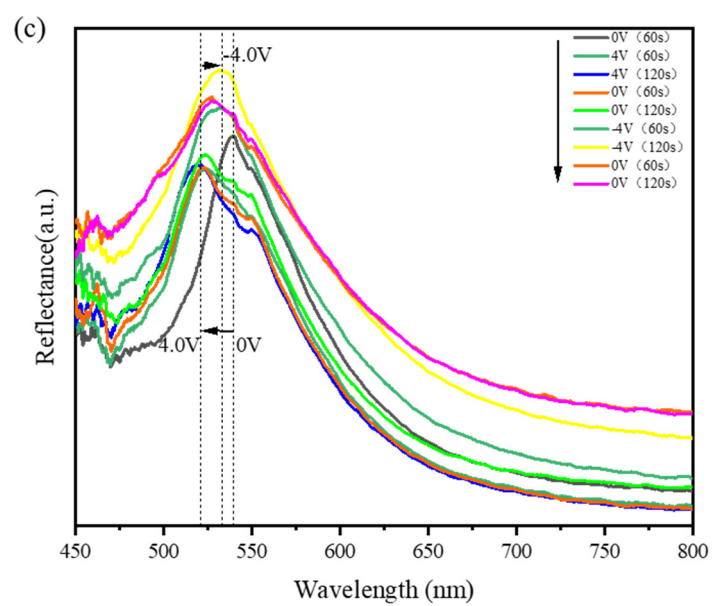


**Figure S4.** SEM images of double-sided tissue paper.



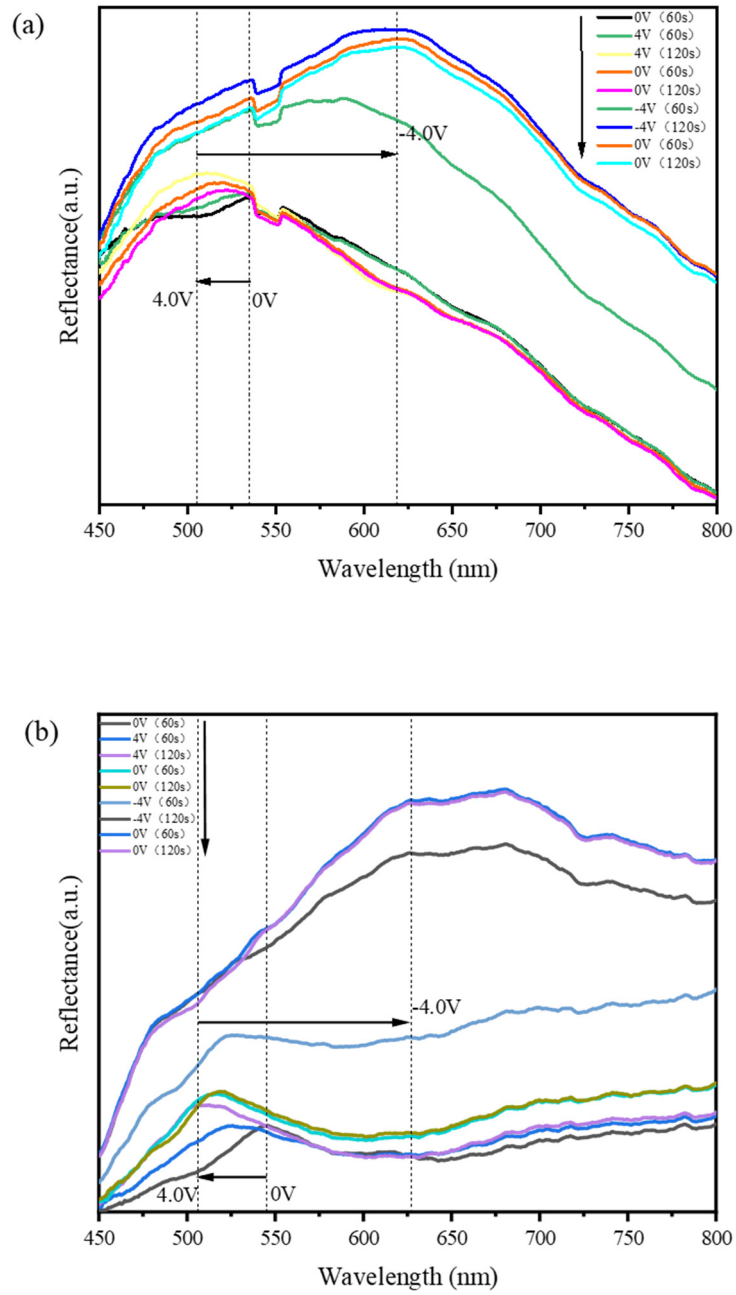
**Figure S5.** SEM image of disordered AA-IOPG organic film constructed based on 193 nm polystyrene microspheres (thickness of film ~105 μm).





**Figure S6.** Variation of reflection spectra over time in the direction of vertical (a), tilt  $12^\circ$  (b),  $25^\circ$  (c) and  $40^\circ$  (d) with different bias voltages ( $\pm 4.0\text{V}$ ).





**Figure S7.** The reflection spectra over time in vertical direction of original (a) and after six months (b) of disordered AA-IOPG under different bias voltages ( $\pm 4.0\text{V}$ ).