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Supporting Information

Metallosupramolecular polymer deposited via inkjet printing for fast-switching pixelated electrochromic devices

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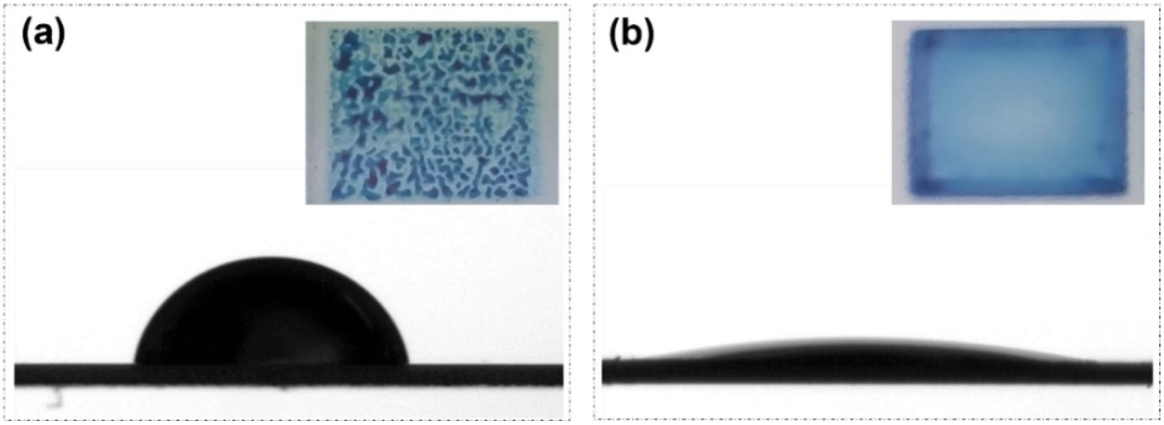

Figure S1. Contact angel of Fe(II)-MEPE polymer inks with (a) water (b) ethanol as solvent on ITO-coated PET substrate (the insets were the typical photograph of the printed film).

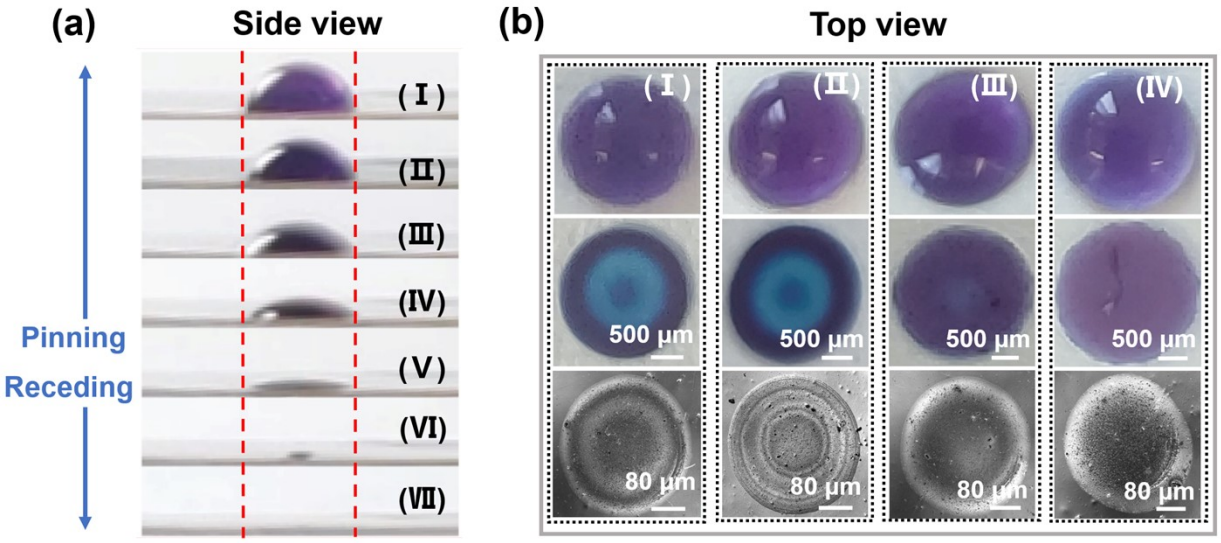

Figure S2. (a) The side view images of Fe(II)-MEPE polymer droplet with water as solvent during drying process on the ITO-coated PET substrate. (b) The top view images of 2 μL Fe(II)-MEPE polymer droplets with water, ethanol, ethylene glycol, and water/ethanol/ethylene glycol (volume ratio of 100:50:10) as solvent from I to IV (top) and the top view images of dried Fe(II)-MEPE droplets (middle). The top view images of sub-microliter Fe(II)-MEPE droplets deposited (bottom).

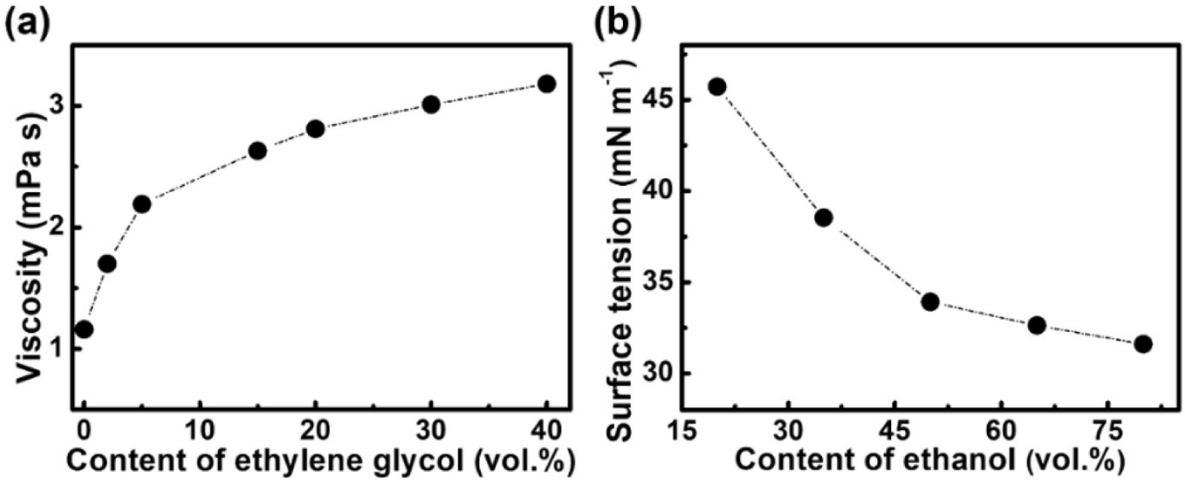

Figure S3. (a) The viscosity of Fe(II)-MEPE inks (with a fixed concentrate of 1 mg mL^{-1}) with different content ethylene glycol relative to water. (b) The surface tension of Fe(II)-MEPE inks with different content ethanol relative to volent of water.

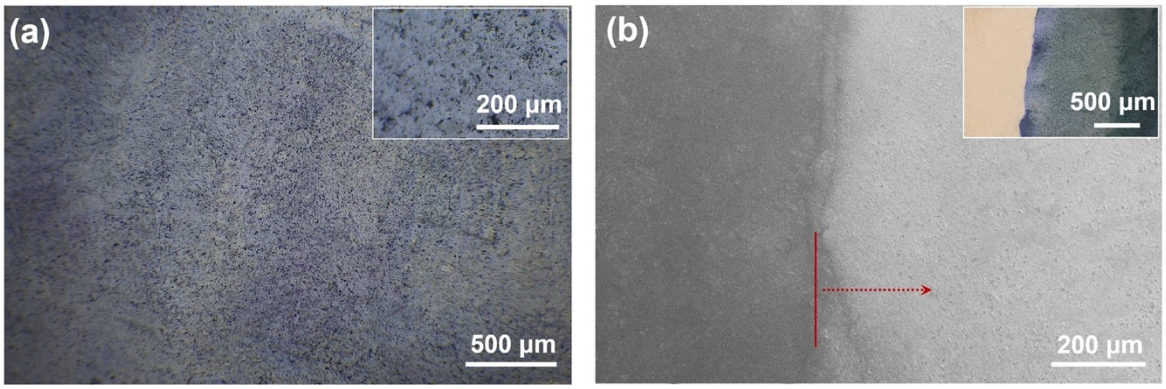

Figure S4. (a) A microscope image of the surface morphology of the inkjet-printed Fe(II)-MEPE film at a magnification of 4 × 16 (inset presents an image at a magnification of 10 × 16); (b) The SEM image of the boundary part of the inkjet-printed Fe(II)-MEPE polymer film (the inset was the optical microscope image).

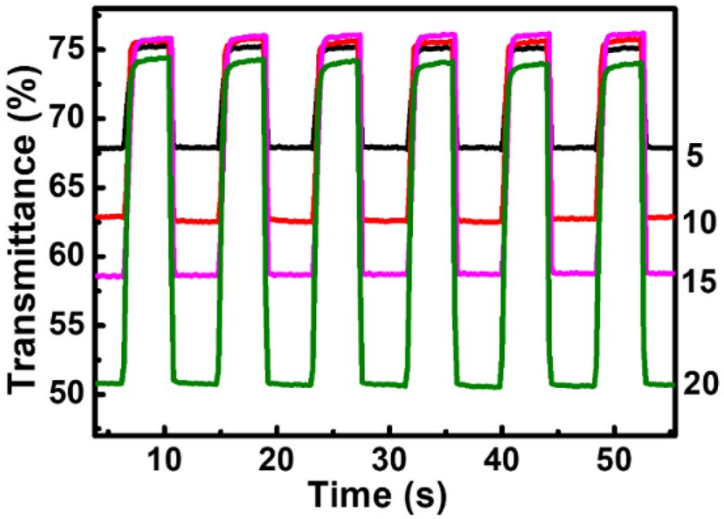

Figure S5. Electrochromic switching behavior of electrochromic films with different printed layers of Fe(II)-MEPE polymer monitored at 584 nm at a voltage of 0 V for 4 s and +1.4 V for 4 s for cycles.

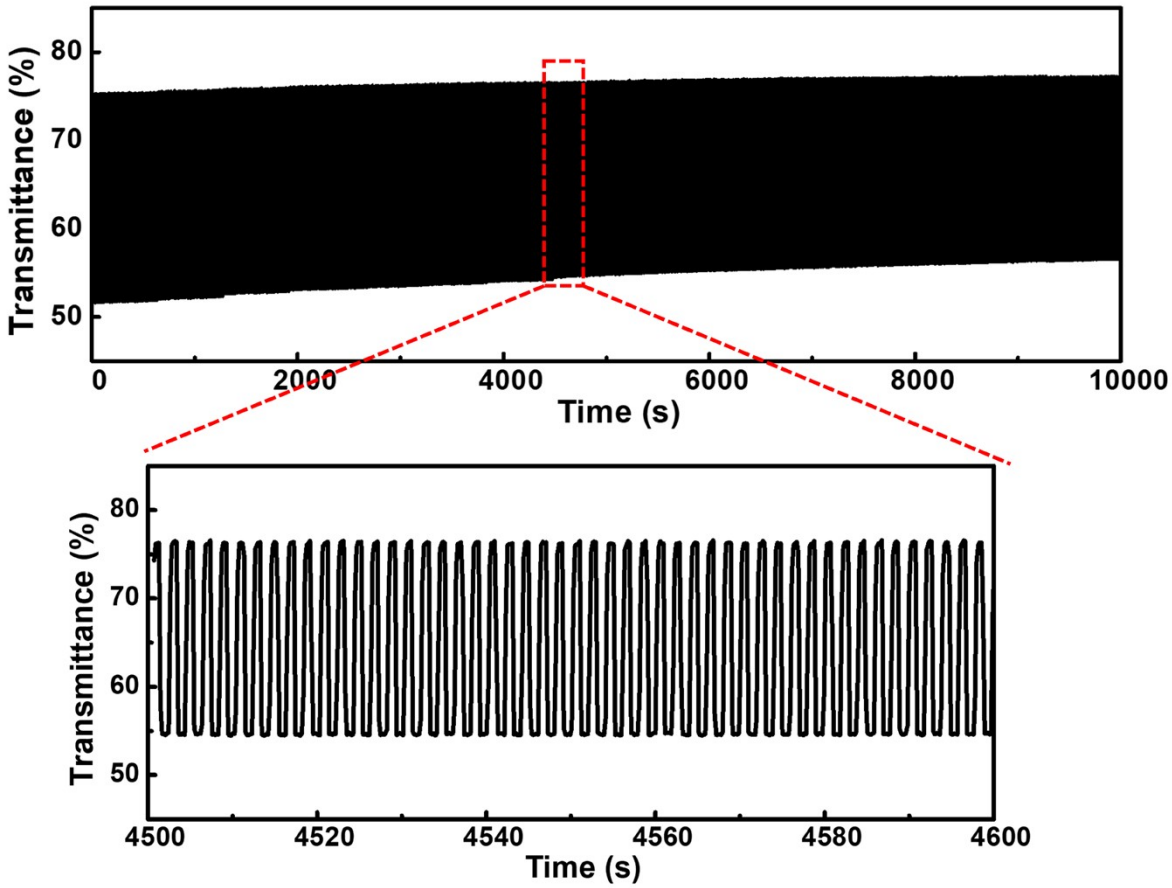

Figure S6. Transient transmittance profile at 584 nm during continuous coloration/bleaching switching 5000 cycles of the printed Fe(II)-MEPE polymer film.

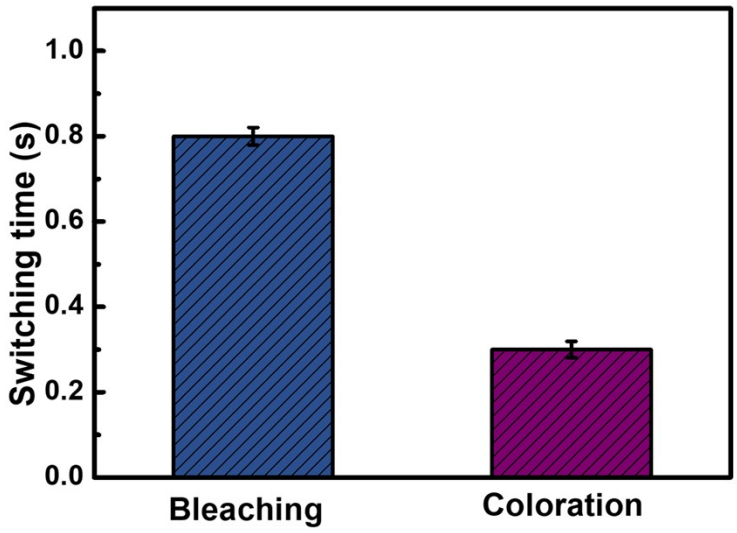

Figure S7. The Fe(Ⅱ)-MEPE film switching speed histogram

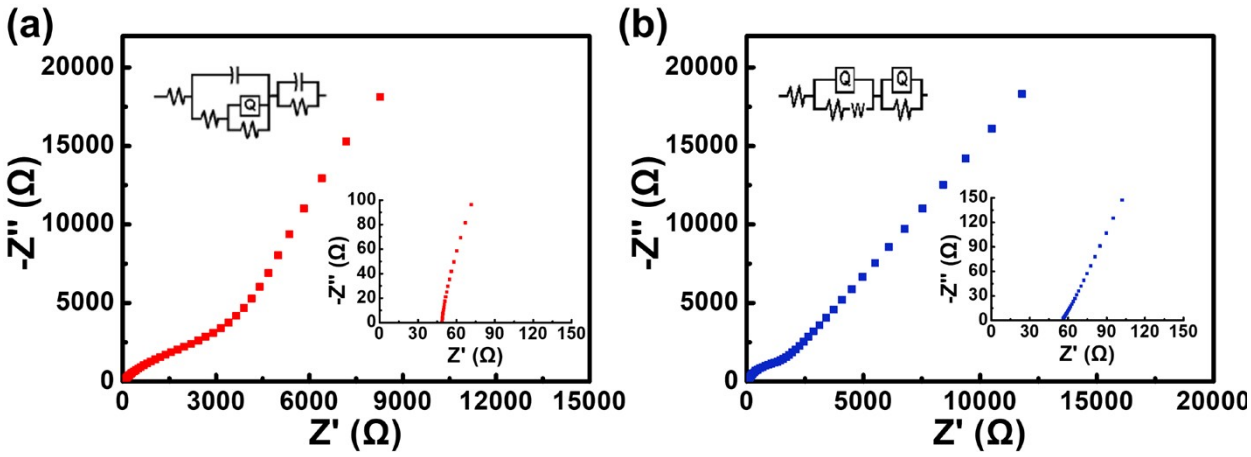

Figure S8. The AC impedance spectra of the ITO-coated PET electrode and the inkjet-printed Fe(II)-MEPE film in the presence of 0.1 M $TBAClO_4$/ACN.

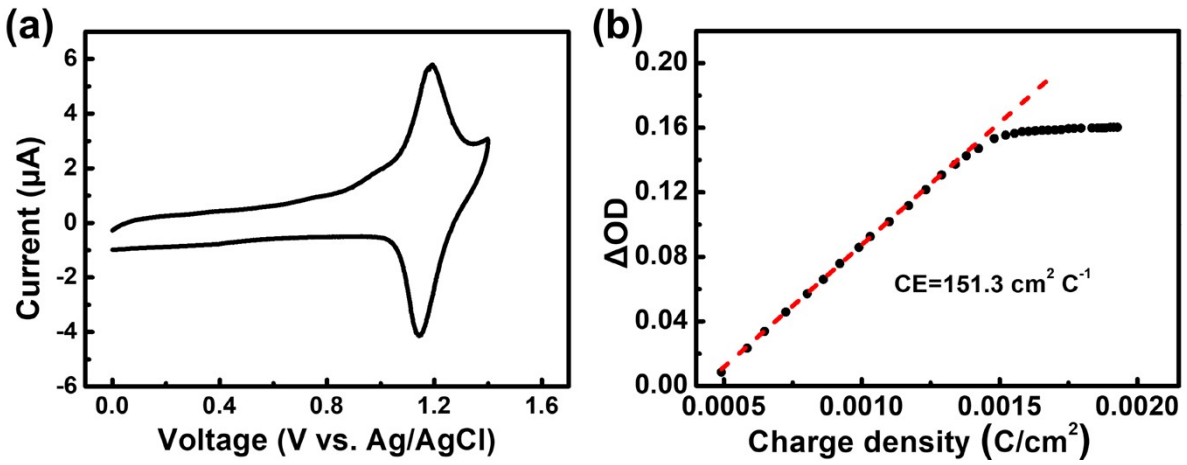

Figure S9. (a) CV (scan rate: 20 mV/s) and (b) plot of the optical density (ΔOD) versus the injected charge density for the printed Fe(II)-MEPE film. The coloration efficiency (CE) was extracted from the slope of the linear fitting in the linear scheme of the plot.

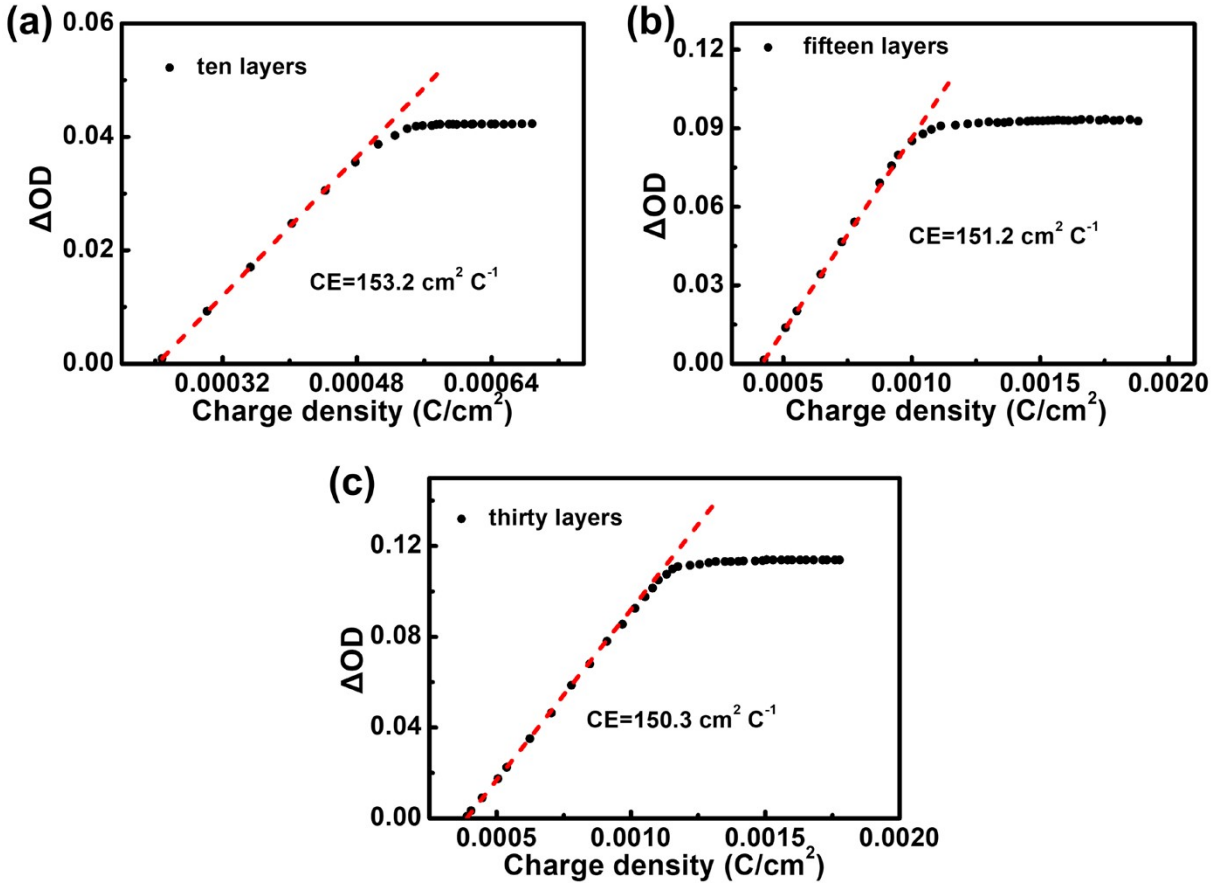

Figure S10. The coloration efficiency of printed Fe(II)-MEPE films in different layers

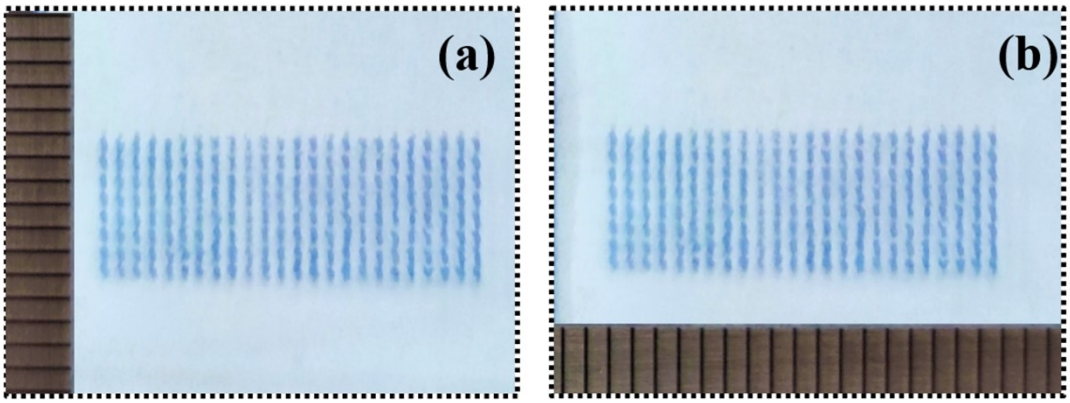

Figure S11. The pixelated Fe(II)-MEPE film with 8 × 24 arrays composed of dot pixels (~ 350 µm × 700 µm) on ITO-coated PET surface (the minimum scale of the ruler is 1.0 mm).

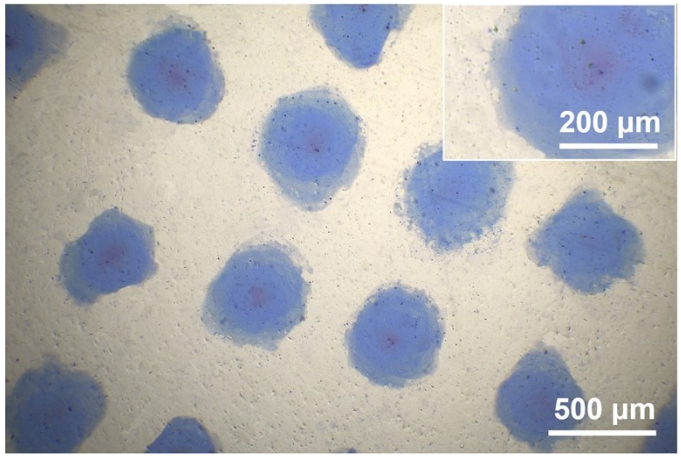

Figure S12. A microscope image of the surface appearance of the inkjet-printed pixels on an ITO-coated PET film using the Fe(II)-MEPE polymer in ternary solvent at a magnification of 4 × 16 (inset presents an image at a magnification of 10 × 16).

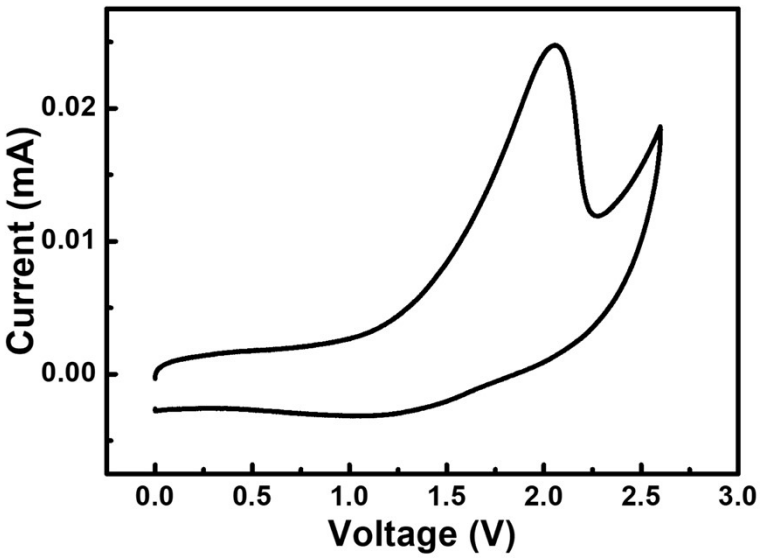

Figure S13. The cyclic voltammetry curve (scan rate: 20 mV/s) of the PECD.

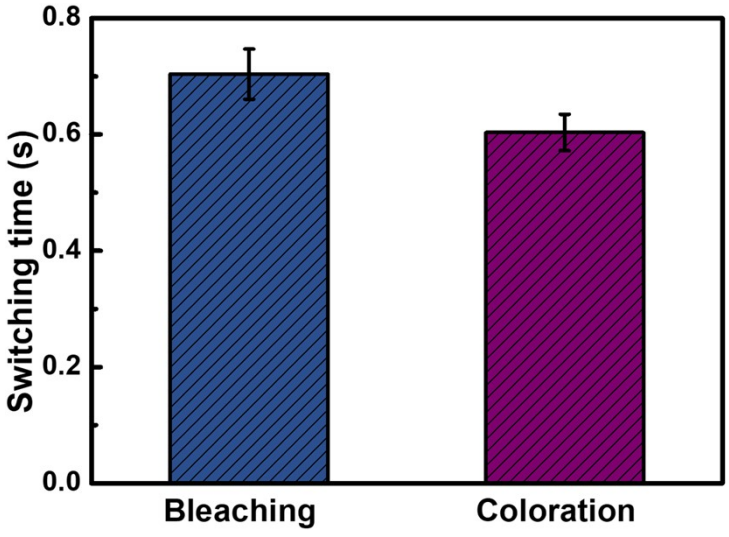

Figure S14. The PECD switching speed histogram.

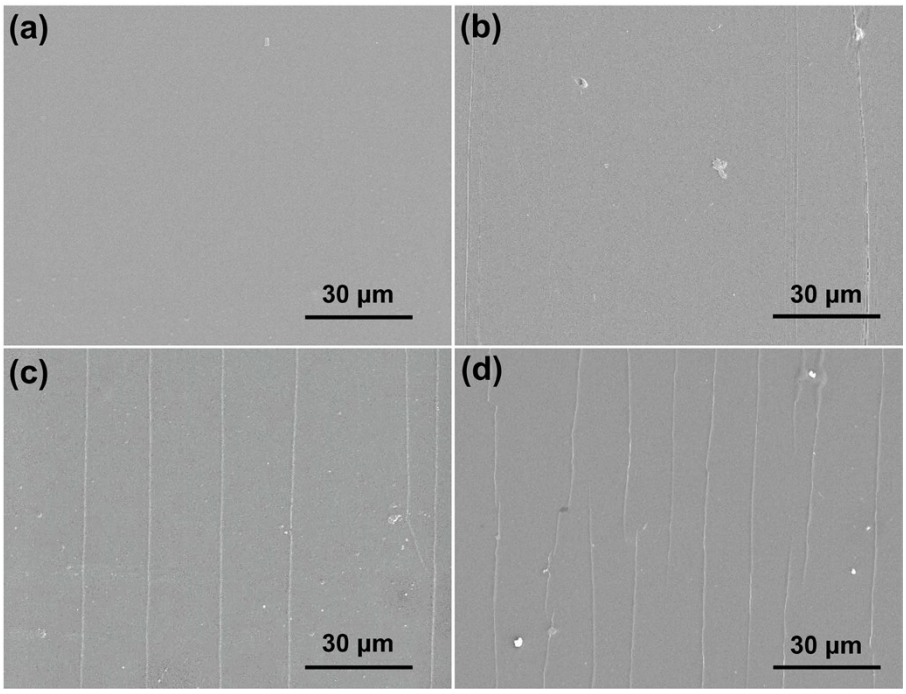

Figure S15. SEM images of ITO-coated PET substrate according to the bending cycles ((a) 0 s, (b) 800 s, (c) 1600 s, and (d) 2400 s).

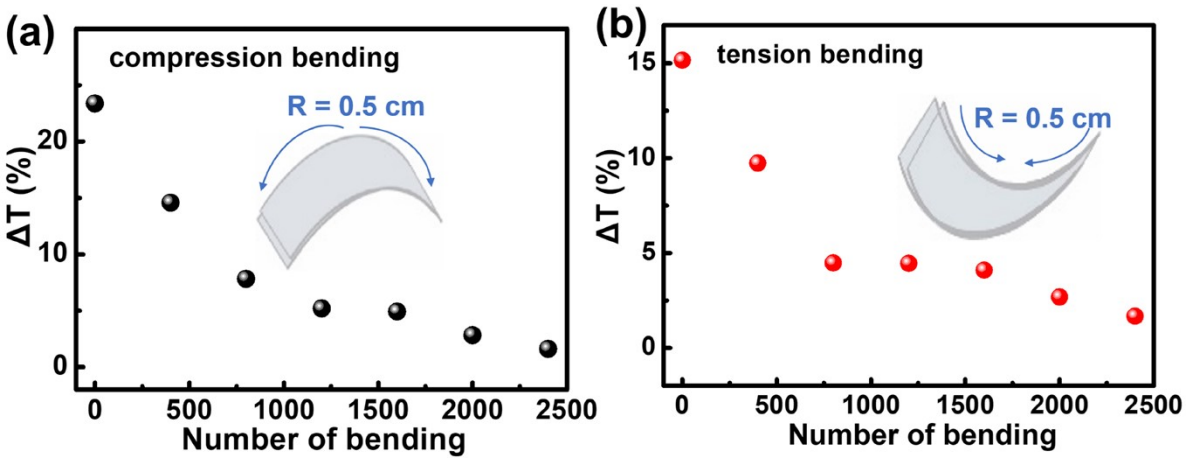

Figure S16. (a, b) Changes of ΔT in film ECD as a function of number of compression and tension bending cycles (bending radius 5 mm).

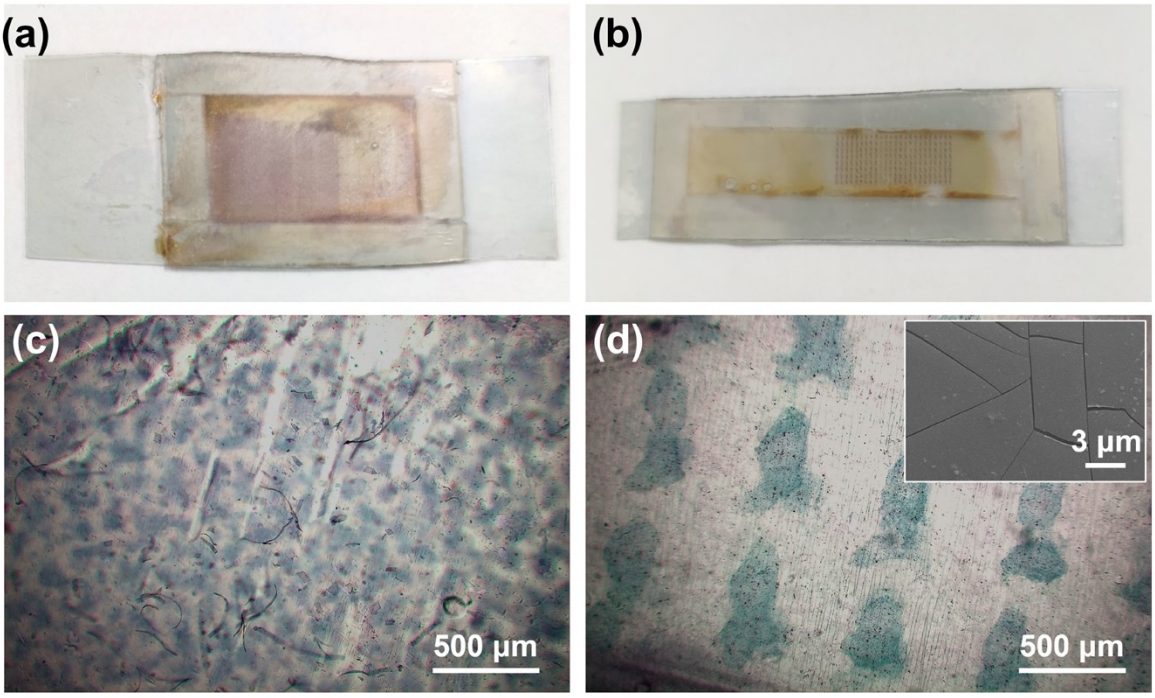

Figure S17. Photographs and optical microscope images at a magnification of 4 × 16: (a and c) printed film ECD and (b and d) PECD after 2400 bending cycles (inset showed the SEM image of pixelated Fe(II)-MEPE after 2400 bending cycles).

Table S1. The physical parameters of the alternative main solvents and inks.

ink	viscosity (mPa s)	surface tension (mN m^{-1})
water	0.8	71.9
ethylene glycol	17.3	48.4
ethanol	1.1	21.9
original ink	2.1	36.8
water/ethanol/ethylene glycol (100:50:5)	2.2	33.9

Table S2. The specific solvent ratio of Fe(II)-MEPE inks used for viscosity testing.

number	water (mL)	ethanol (mL)	ethylene glycol (mL)
1	100	50	0
2	100	50	2
3	100	50	5
4	100	50	15
5	100	50	20
6	100	50	30
7	100	50	40

Table S3. The specific solvent ratio of Fe(II)-MEPE inks used for surface tension testing.

number	water (mL)	ethanol (mL)	ethylene glycol (mL)
1	100	20	5
2	100	35	5
3	100	50	5
4	100	65	5
5	100	80	5

Table S4. The EIS fitting results of the electrode.

electrode	R_s ($\Omega \cdot cm^2$)	R_{ct1} ($\Omega \cdot cm^2$)	R_{ct2} ($\Omega \cdot cm^2$)	W ($\Omega \cdot cm^2$)	R_{ct3} ($\Omega \cdot cm^2$)
ITO-coated PET film	48.9	12.5	5.9×10^3	—	9.8×10^4
printed Fe(II)-MEPE film	55.1	1.0×10^3	7.8×10^{13}	7×10^4	—