Supporting Information

Enhanced electrochromic and energy storage performance in mesoporous WO_3 film and its application in bi-functional smart window

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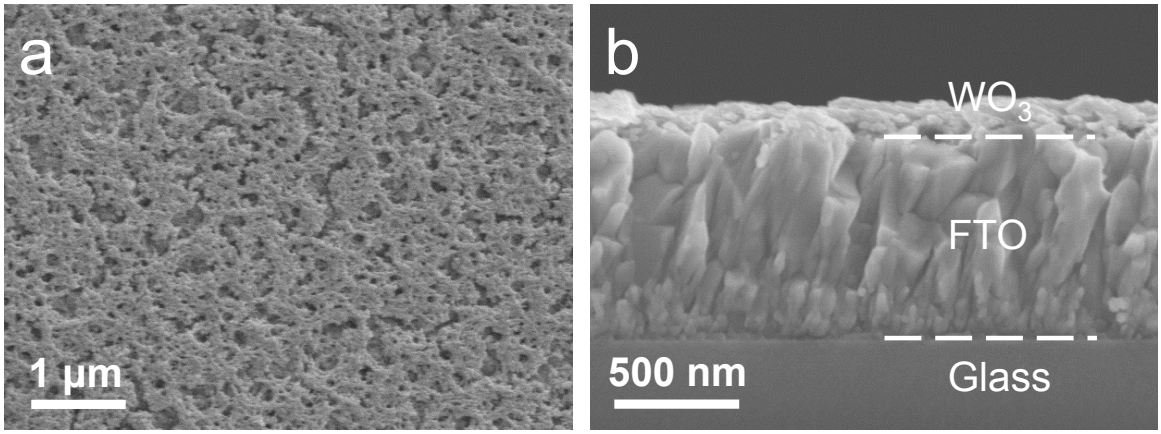

Figure S1. (a) SEM image and (b) cross sectional view of the macroporous WO_3 thin film on FTO glass.

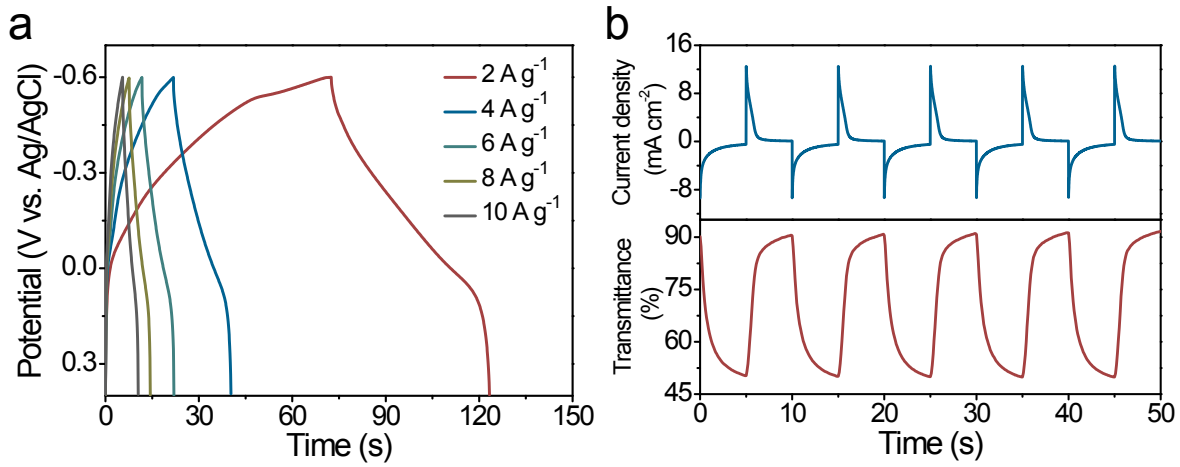

Figure S2. (a) Galvanostatic charge/discharge curves of the macroporous WO_3 film at different current densities. (b) Chronoamperometry curve and the corresponding in situ transmittance curve at 633 nm for the macroporous WO_3 film.

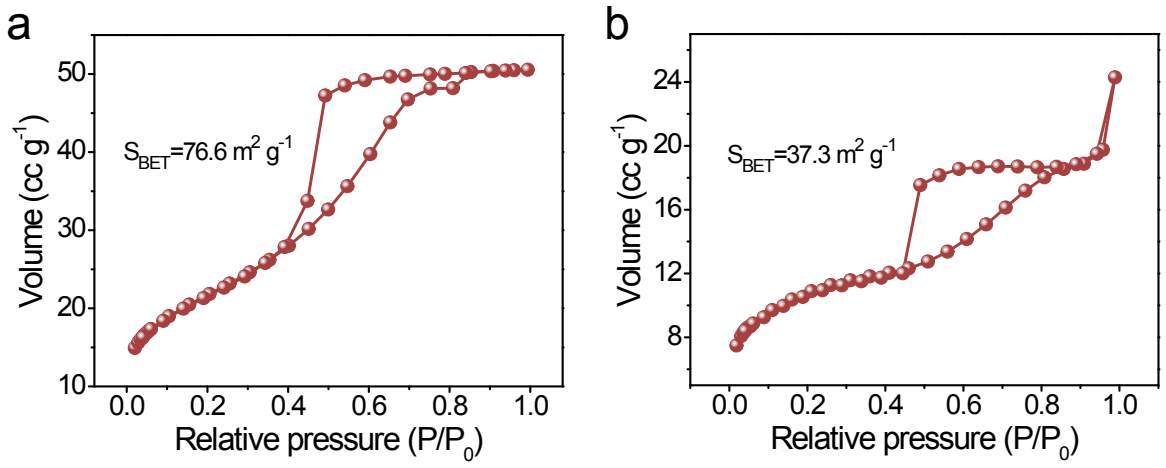

Figure S3. Nitrogen adsorption-desorption isotherm curve of (a) mesoporous WO_3 film and (b) macroporous WO_3 film.

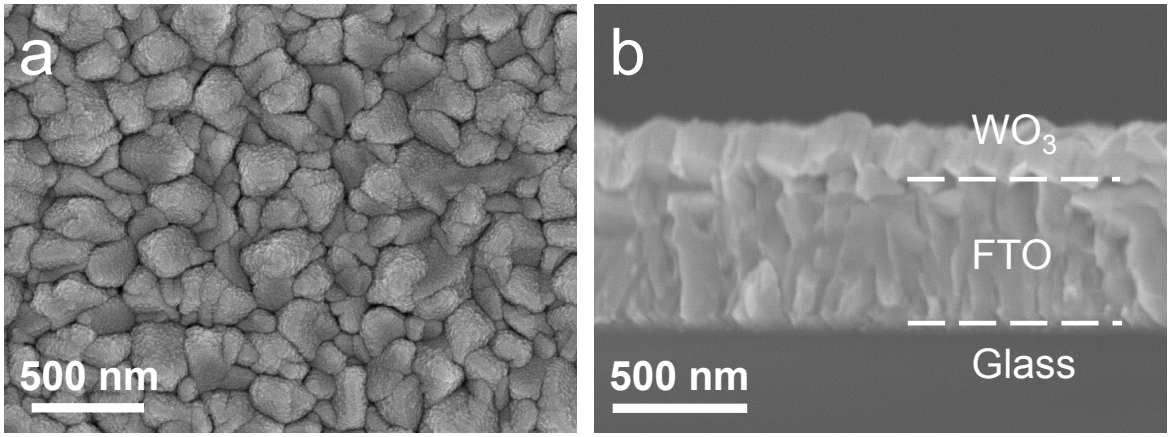

Figure S4. (a) SEM image and (b) cross sectional view of the dense WO_3 thin film on FTO glass.

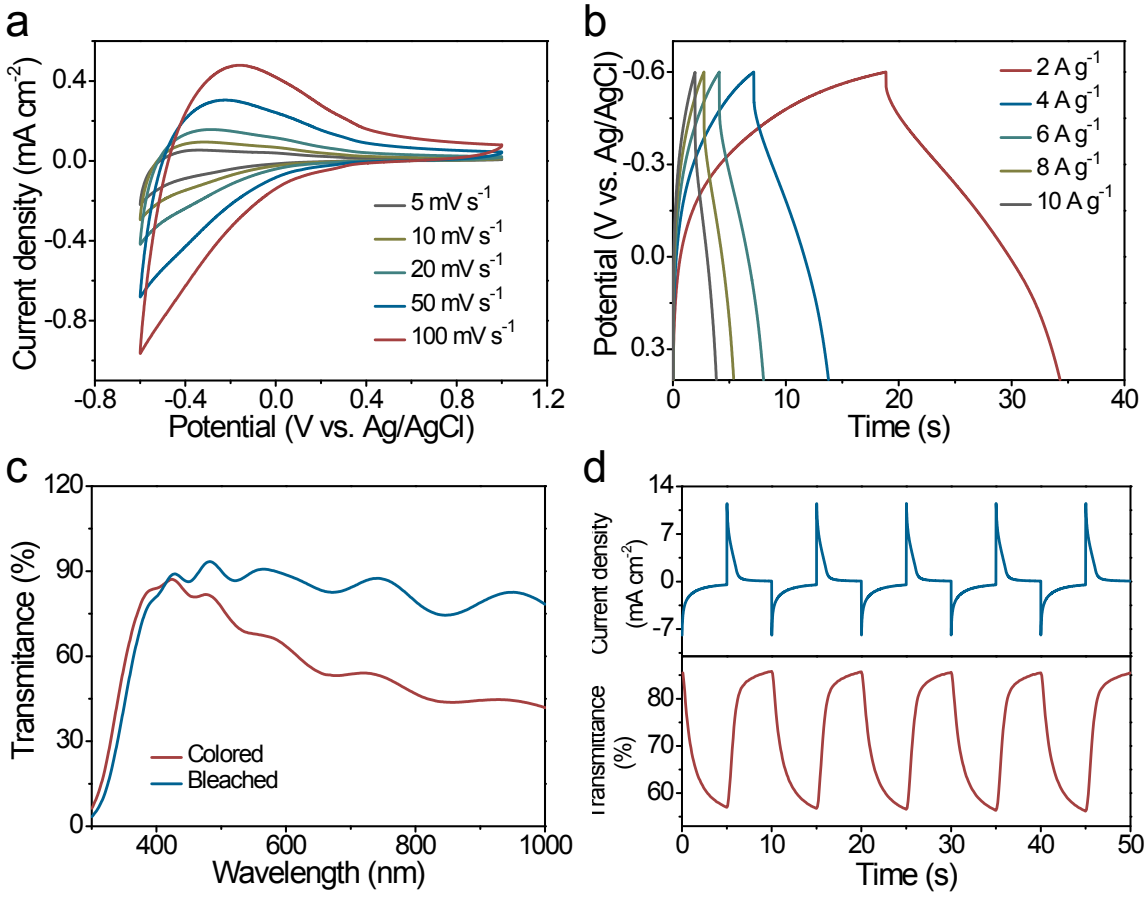

Figure S5. (a) CV curves of the dense WO_3 film at different scan rates. (b) Galvanostatic charge/discharge curves of the dense WO_3 film at different current densities. (c) Transmittance spectra of the dense WO_3 film for different working states (bleached and colored). (d) Chronoamperometry curve and the corresponding in situ transmittance curve at 633 nm for the dense WO_3 film.

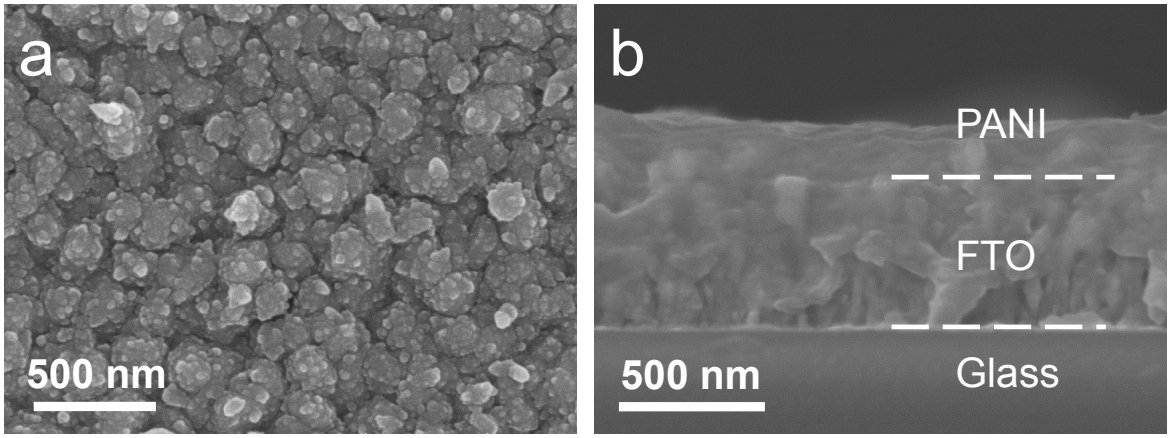

Figure S6. (a) SEM image and (b) cross sectional view of the PANI nanoparticles film on FTO glass.

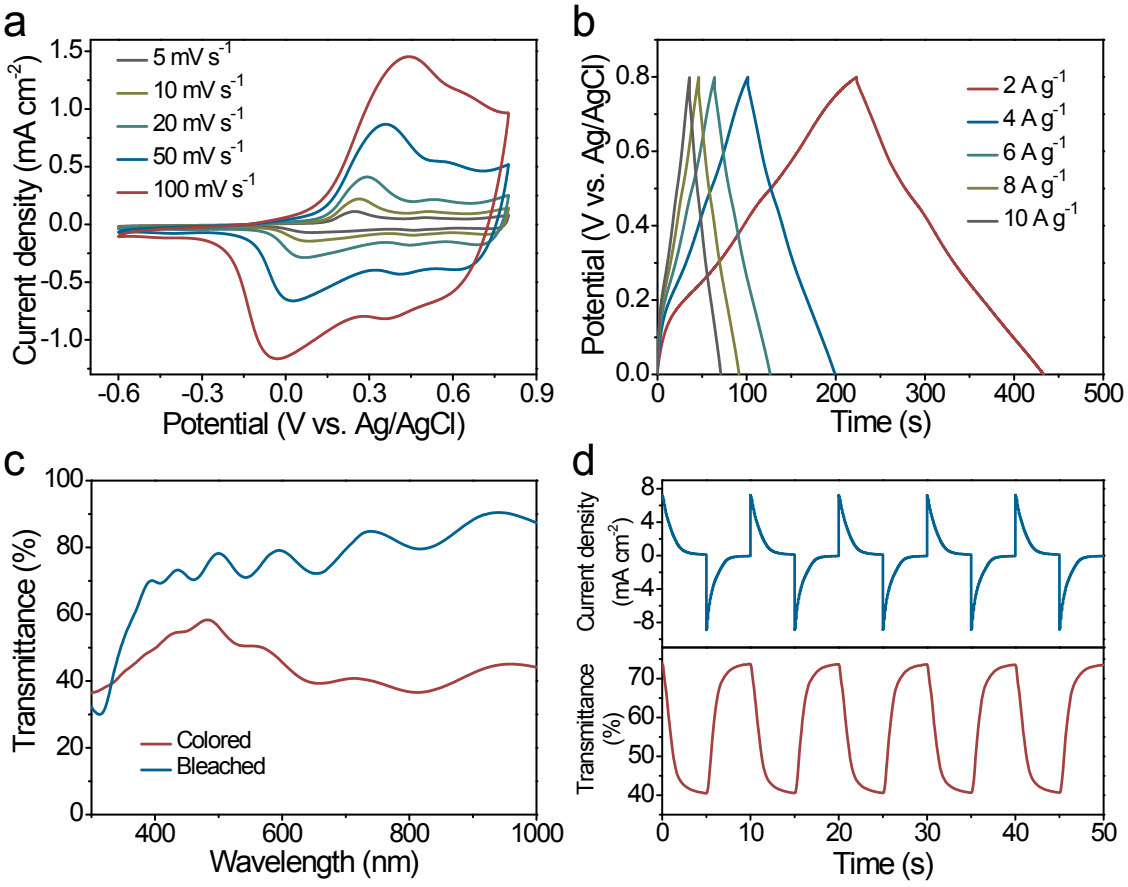

Figure S7. (a) CV curves of the PANI film at different scan rates. (b) Galvanostatic charge/discharge curves of the PANI film at different current densities. (c) Transmittance spectra of the PANI film for different working states (bleached and colored). (d) Chronoamperometry curve and the corresponding in situ transmittance curve at 633 nm for the PANI film.

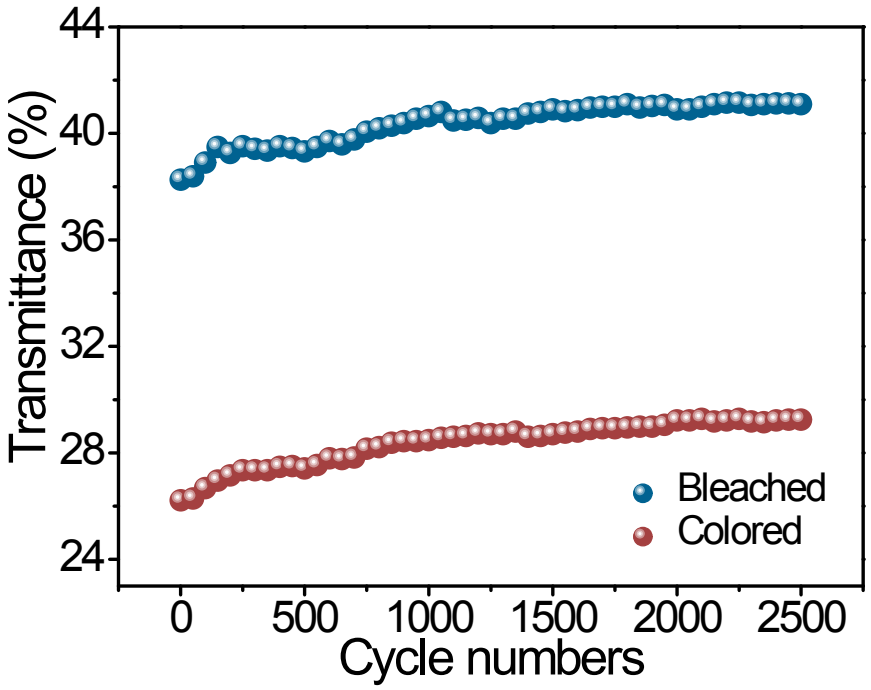

Figure S8. Electrochromic cyclic stability of the macroporous WO_3 based device tested at 0 and 1 V for 2500 cycles.

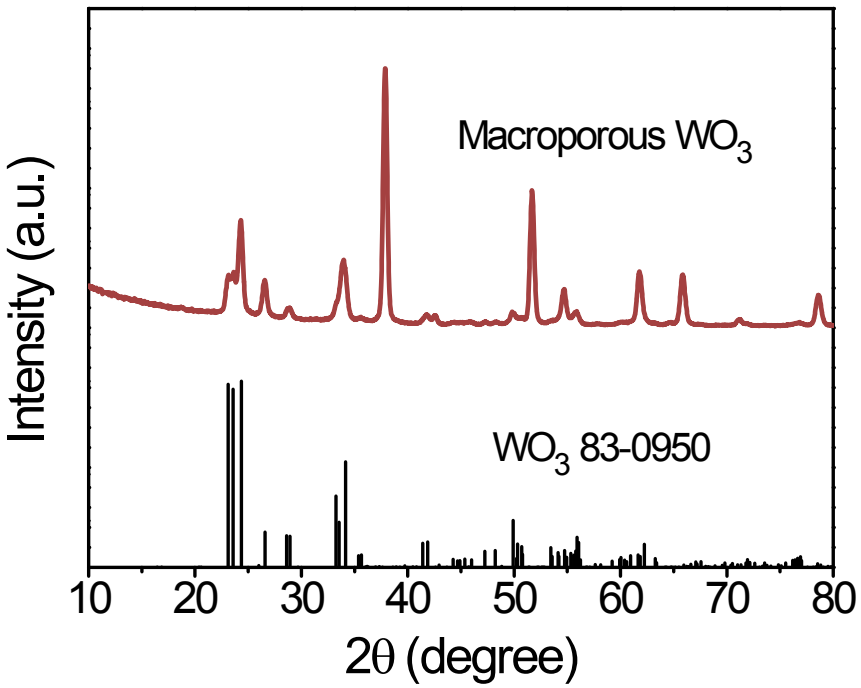

Figure S9. XRD patterns of the macroporous WO_3 film.

Table S1. Transparency, optical modulation and switching speed of different morphology WO_3 film in the recent literatures.

Morphology	Electrolyte	Transparency (633 nm)	ΔT (633 nm)	t_c / t_b (s)	Ref.
WO_3 nanowire arrays	1M $LiClO_4$	72%	58%	7.6 s/4.2 s	1
Ordered macroporous WO_3	0.5M H_2SO_4	78%	52%	5.6 s/1.8 s	2
WO_3 nanoparticle	1M H_2SO_4	91.3%	72.6%	3.1 s/0.9 s	3
WO_3 nanosheet	0.5M H_2SO_4	72%	62%	5.2 s/2.2 s	4
WO_3 Quantum Dots	1M H_2SO_4	94%	85%	0.9 s/1.0 s	5
WO_3 nanoflake	1M $LiClO_4$ / PC	70%	68%	9.3 s/5.7 s	6
WO_3 nanoplate	0.5M H_2SO_4	—	38%	4.3 s/1.4 s	7
WO_3 nanoporous network (0.2 μm thick)	0.1M H_2SO_4	98% (650nm)	20% (650nm)	9.8 s/3.9 s	8
Amorphous WO_3	0.5M HCl	83% (550nm)	75% (550 nm)	9.8 s/3.0 s	9
Mesoporous WO_3	0.5M H_2SO_4	99.5%	75.6%	2.4 s/1.2 s	Our work

References

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