Electronic Supplementary Information (ESI)

For

Constructing Spraying-Processed Complementary Smart Windows via Electrochromic Materials with Hierarchical Nanostructures

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Supplementary Figures and Table

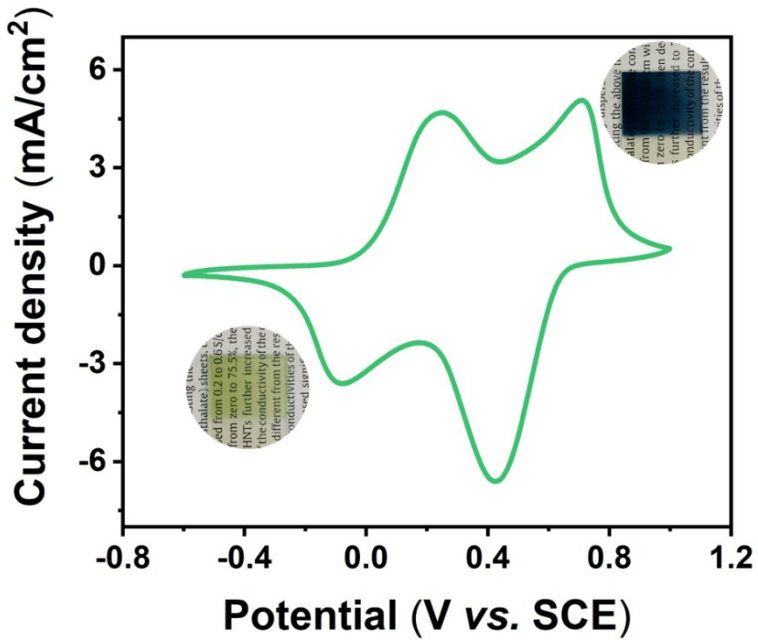

Figure S1. The CV curve of HNT@PANI. Inset: Photographs of HNT@PANI film in colored and bleached states.

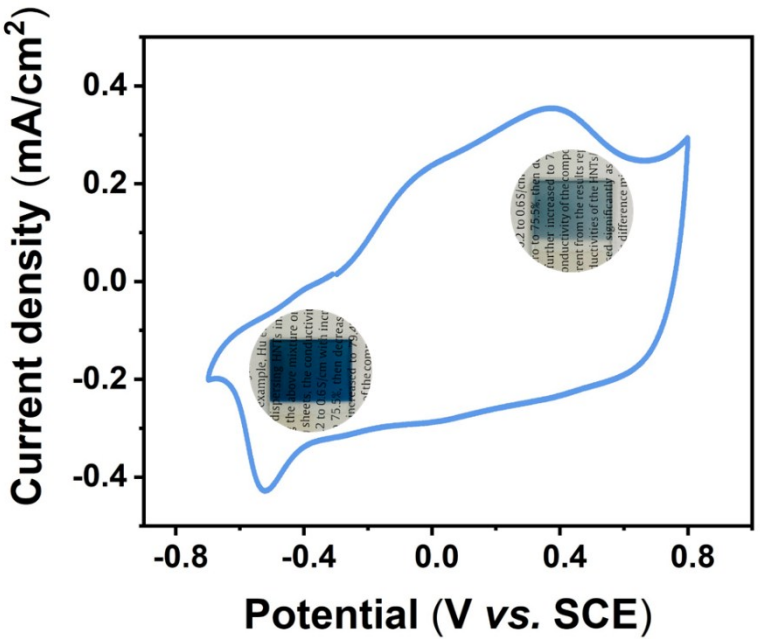

Figure S2. The CV curve of HNT@PEDOT. Inset: Photographs of HNT@PEDOT film in colored and bleached states.

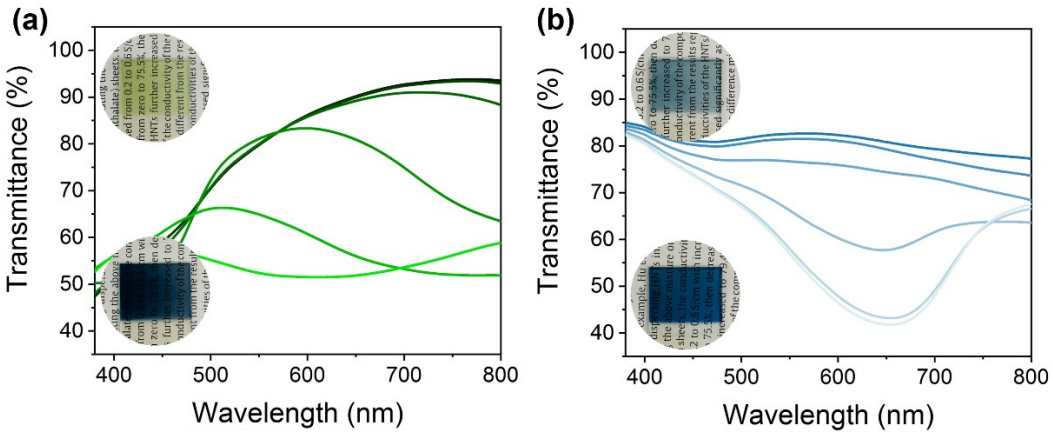

Figure S3. The transmittance spectra of a) HNT@PANI film and b HNT@PEDOT film.

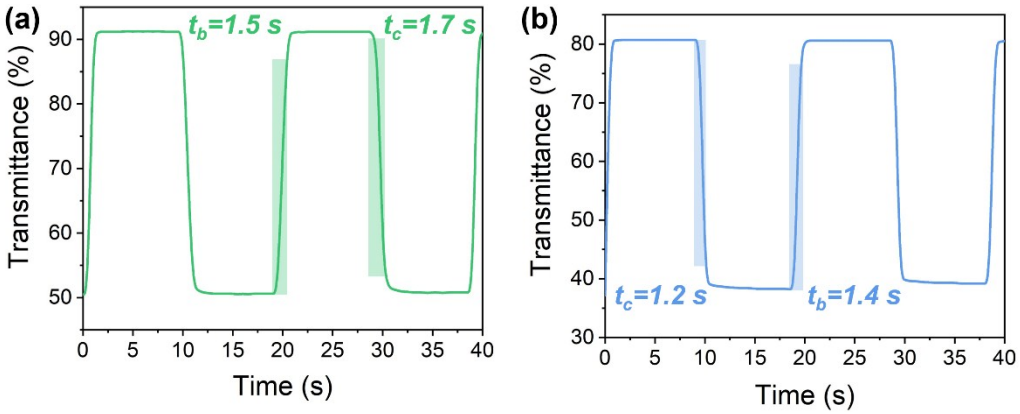

Figure S4. The *in-situ* response of a) HNT@PANI film and b) HNT@PEDOT film

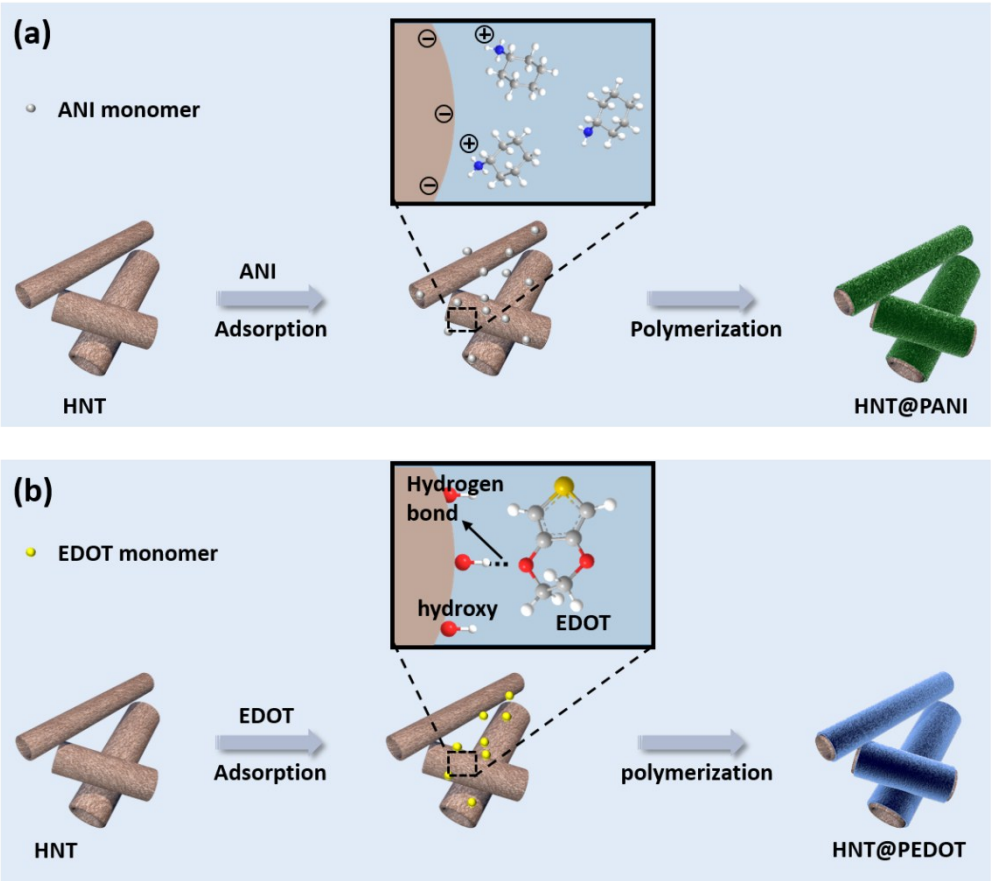

Figure S5. The schematic mechanism of a) PANI and b) PEDOT growth on HNT outer surface

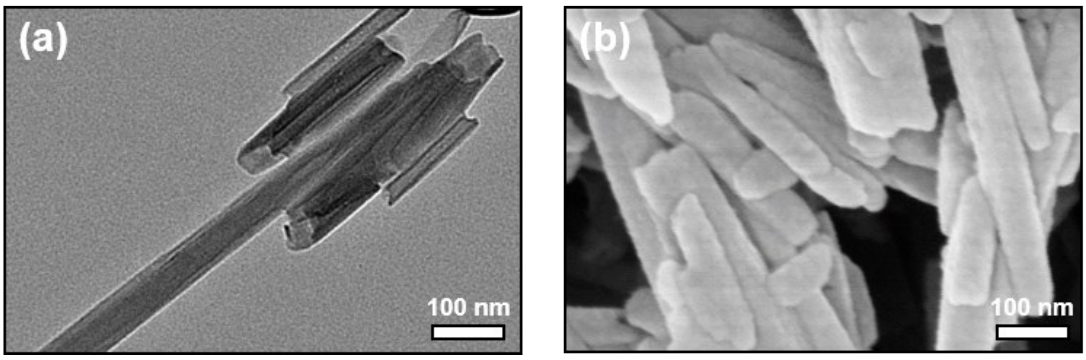

Figure S6. The TEM and SEM images of halloysite nanotubes.

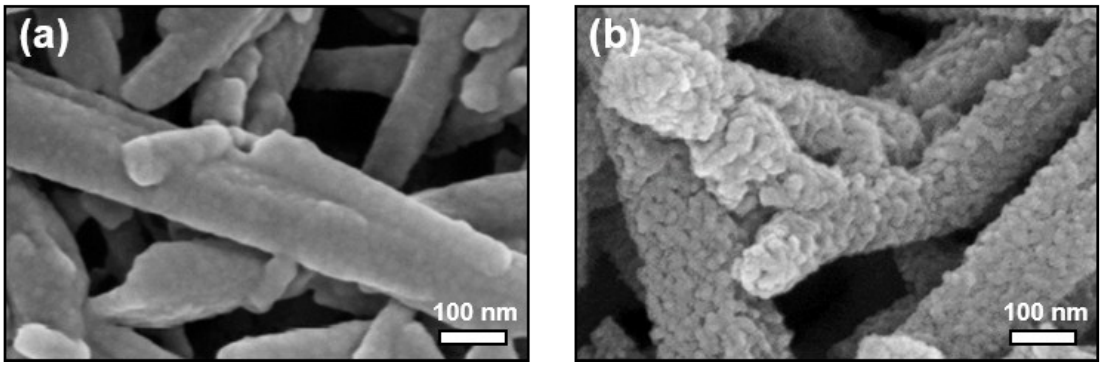

Figure S7. Different morphologies on HNT outer surface of HNT@PANI and HNT@PEDOT nanocomposites.

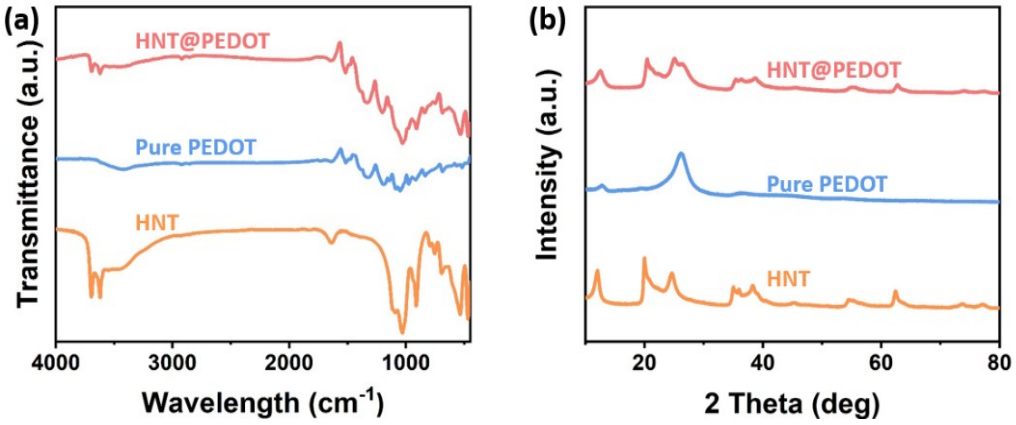

Figure S8. a) FTIR spectra and b) XRD of HNT, pure PEDOT and HNT@PEDOT.

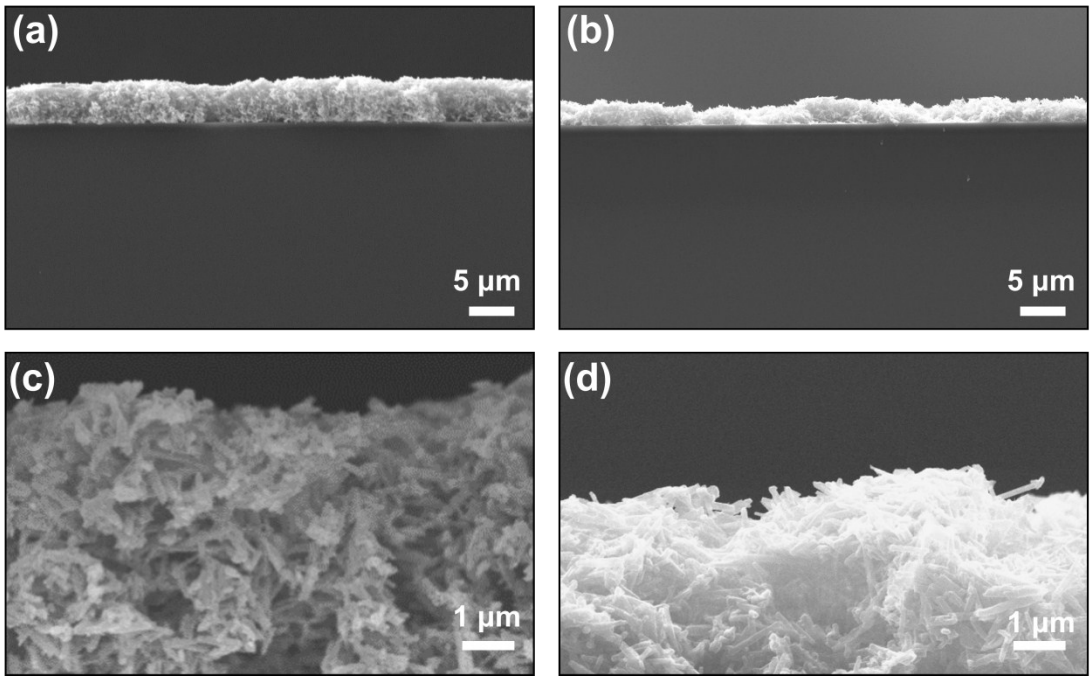

Figure S9. SEM images (cross-section) of a, c) the HNT@PANI film and b, d) HNT@PEDOT film.

Table S1. A partial list of devices reported in the literature

Structure	Response (s)	Cycles	Retention	Ref.
SiO2-PANI/GE/SiO2-PEDOT	3	50	86%	1
WO3/GEL/NIO	20	100	66%	2
TPPT/GEL/Fc	20	200	90%	3
TPBT/GEL/Fc	20	200	90%	3
PolyFe/GEL	2	300	55%	4
PSS-polyFe12	1	300	100%	4
PSS-polyFe11	1	300	100%	4
WO3/PEDOT:PSS/electrolyte/CeO2/TiO2	12	300	77%	5
CNT@PANI/GEL/CNT@PEDOT	> 1	500	100%	6
Bi/Cu/GEL/Cu	> 10	1000	100%	7
ICZ-based/GEL/PEDOT	0.5	1100	100%	8
PProDOT-Et2/GEL/PB	> 1	1200	98%	9
PR-Br/GEL/PW12/TiO2	< 0.5	2500	100%	10
PR-Br/BMIL/TNP	< 0.5	3000	100%	11
ECP-magenta/GEL/a-Nb2O5	1	3100	98%	12
PEDOT/GEL/PB	> 1	10000	60%	13
PAni/PPy–PEDOT	1	10000	80%	14
PPy/PAni–PEDOT	< 1	10000	90%	14
HNT@PANI/GEL/HNT@PEDOT	0.5	5000 (10000)	100% (96%)	This work

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