

Supporting Information

Contents

1. *Figure S1* – TGA and DSC plot for V-MOF
2. *Figure S2* – SEM, TEM, HRTEM images and EDX mapping data for V_2O_5 -2 sample
3. *Figure S3* – Raman spectra of V_2O_5 samples
4. *Figure S4* – XPS data including survey spectra and deconvoluted spectra of V_2O_5 -2 sample
5. *Figure S5* – N_2 gas adsorption isotherms, BET fittings and pore size distribution plots for V_2O_5 -1 and V_2O_5 -2 samples
6. *Figure S6* – Photographs of V_2O_5 -1 electrode at different potentials; transmission and optical modulation spectra of V_2O_5 -2 electrode in three-electrode set-up
7. *Figure S7* – Switching times and coloration efficiencies for both samples at 1000 nm
8. *Figure S8* – EIS data for both samples and equivalent circuit diagram used for data fitting
9. *Table S9* – Fitted resistance values for the samples obtained from EIS data fitting
10. *Figure S9* – Scan rate dependent CV data and $\log(i)$ vs $\log(v)$ plot of V_2O_5 -2 electrode
11. *Figure S10* – Decoupling the current contributions in V_2O_5 -1 electrode
12. *Figure S11* – FESEM images and ATR-FTIR data of PANI film
13. *Figure S12* – CV of PANI electrode at 20 mVps scan rate in three-electrode set-up
14. *Figure S13* – Transmission spectra and digital photographs of PANI films at different voltages along with optical modulation spectra; transmission modulation at a particular wavelength with change in current density
15. *Figure S14* – Scan rate dependent CV data for PANI electrode and deconvoluted current contributions with scan rate
16. *Figure S15* – GCD profiles of PANI electrodes; comparison of areal capacitances from CV and GCD data; in-situ change in transmittance with GCD curves

17. *Figure S16* – $\log(i)$ vs $\log(v)$ plot at different voltages for 2-electrode system and deconvoluted current contributions at different scan rates

18. *Figure S17* – Gradual change in transmission spectra of the multicolored device upon application of bias

19. *Figure S18* – Cycling performance of MECASC and GCD profiles with dynamic in-situ transmission modulations before and after cycling

20. *Figure S19* – Morphology of V_2O_5 electrode before and after cycling

21. *Figure S20* – Morphology of PANI electrode before and after cycling

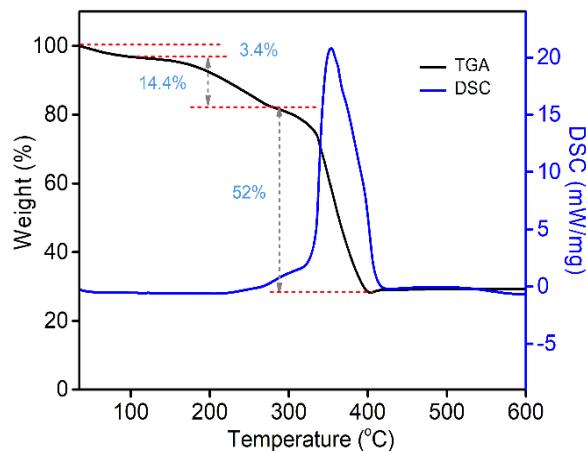


Figure S1: TGA and DSC data for V-MOF

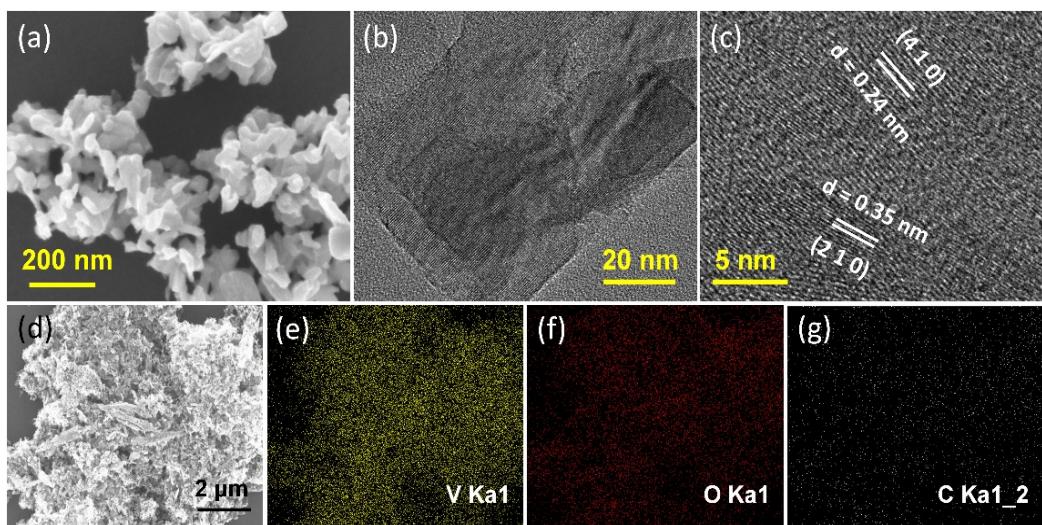


Figure S2: SEM, TEM and EDX mapping data for V_2O_5 -2 sample

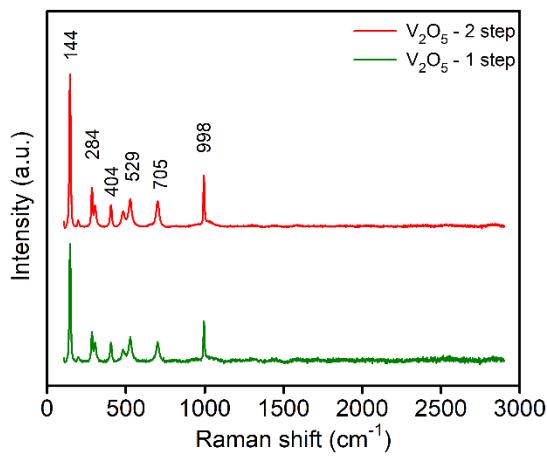


Figure S3: Raman data for both V_2O_5 samples

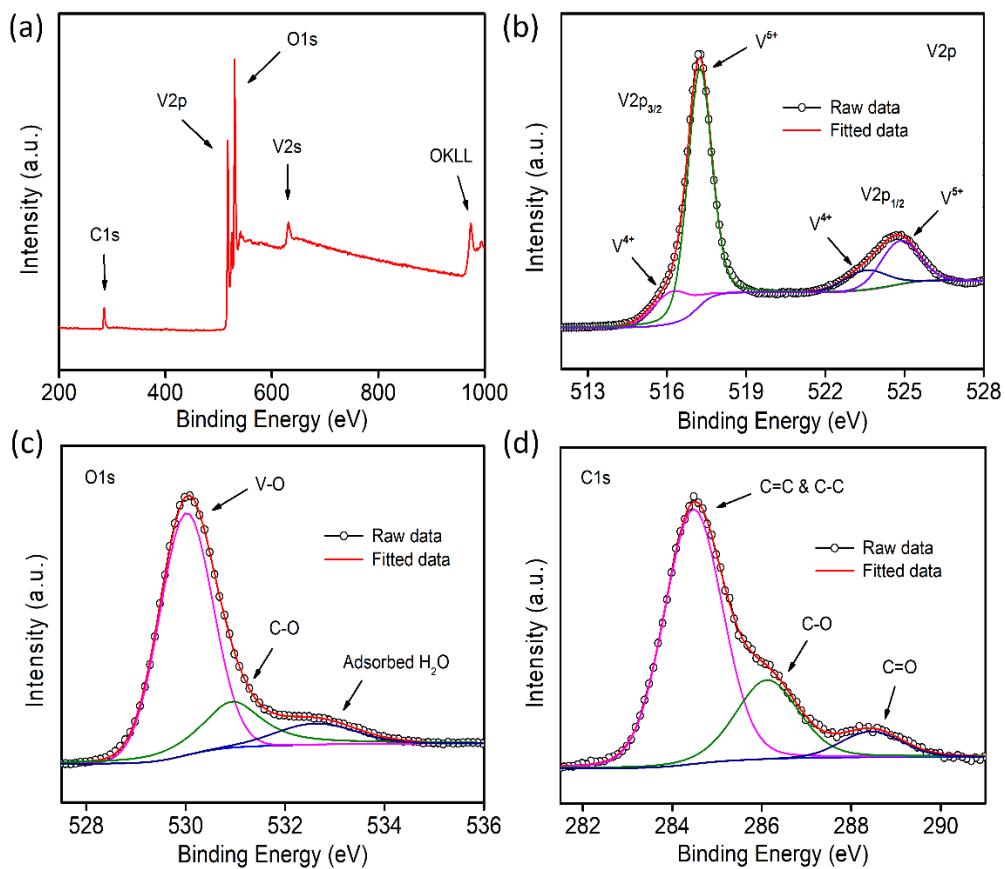


Figure S4: XPS data including survey spectra and the deconvoluted spectra of V_2O_5 -2 sample

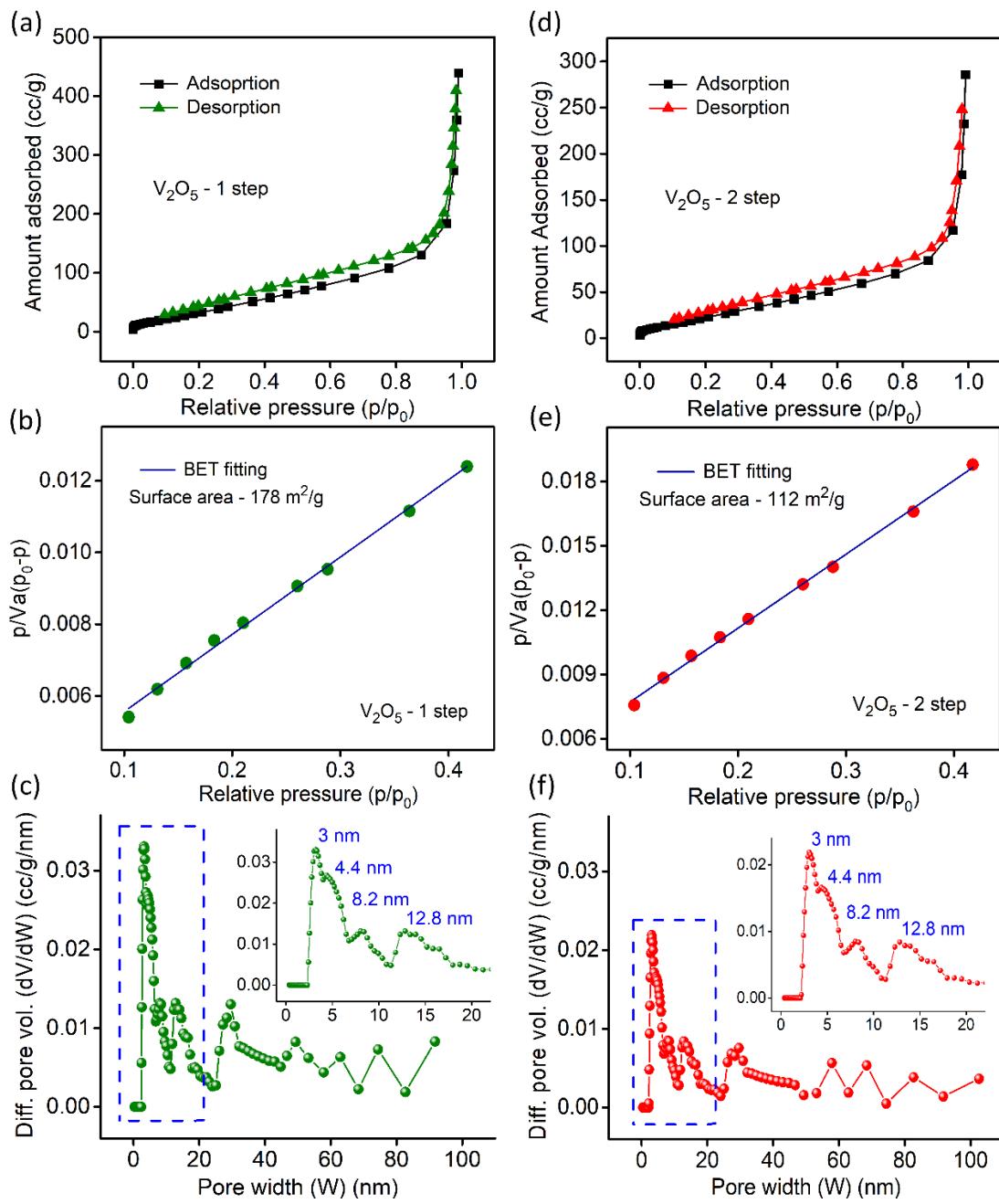


Figure S5: N_2 gas adsorption isotherm at 77 K, BET fitting data and NLDFT pore size distribution data for (a)-(c) V_2O_5 -2 and (d)-(f) V_2O_5 -1 samples

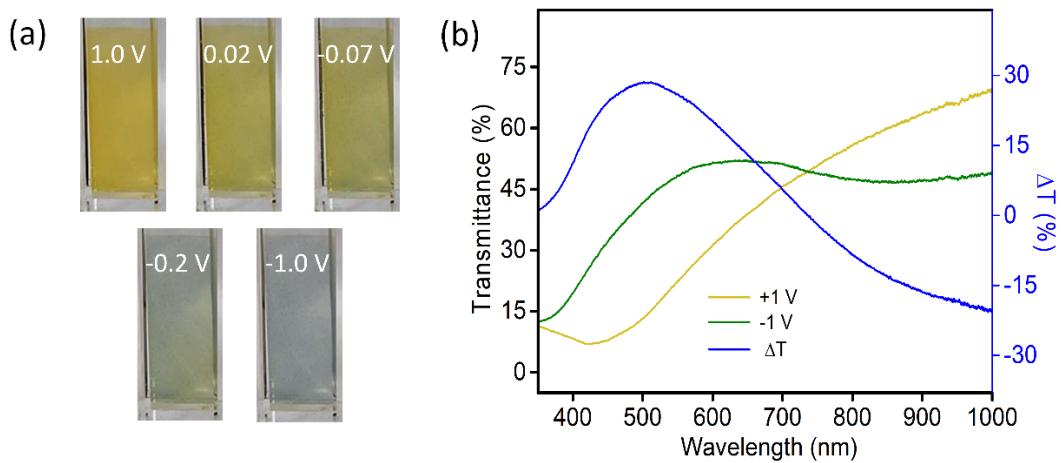


Figure S6: (a) Photographs of V_2O_5 -1 electrode at different potentials, (b) Transmission and optical modulation spectra of V_2O_5 -2 electrode in 3-electrode set-up

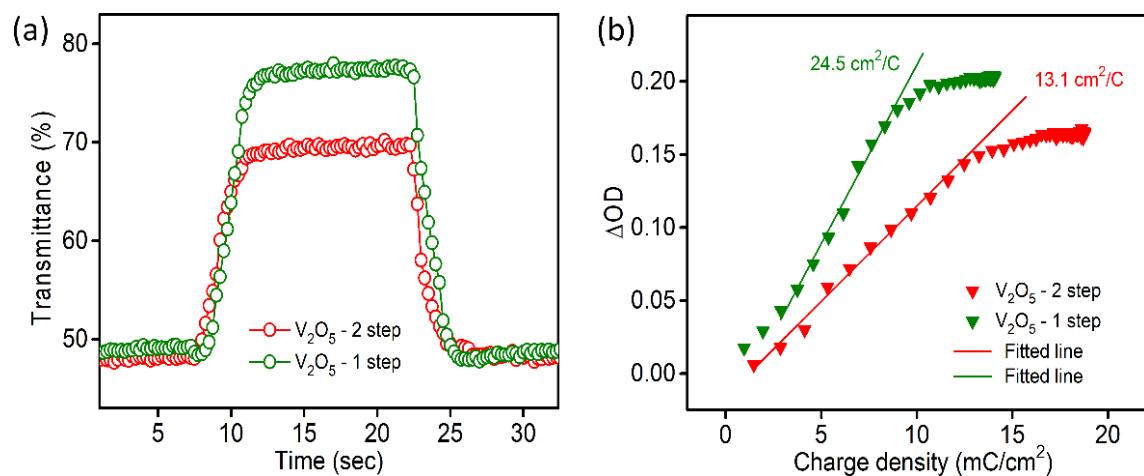


Figure S7: (a) Switching times and (b) coloration efficiencies at 1000 nm for both samples

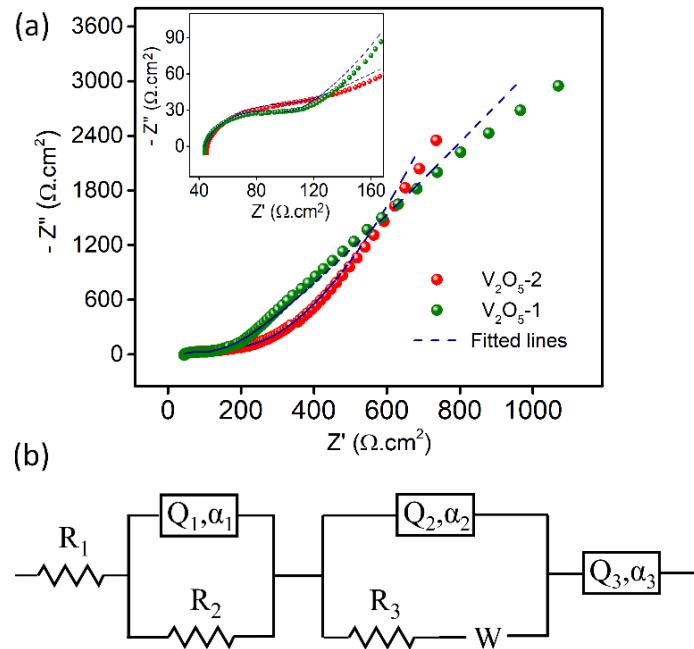


Figure S8: (a) Nyquist plots of the samples, (b) equivalent circuit diagram

Table S1: Comparison of resistance values obtained from modelling the Nyquist plots

Films	R_1 (Ωcm^2)	R_2 (Ωcm^2)	R_3 (Ωcm^2)	Measurement error (%)
$\text{V}_2\text{O}_5\text{-1}$	43.87	50.2	58.1	< 3.31
$\text{V}_2\text{O}_5\text{-2}$	45.31	97.1	60.3	< 2.95

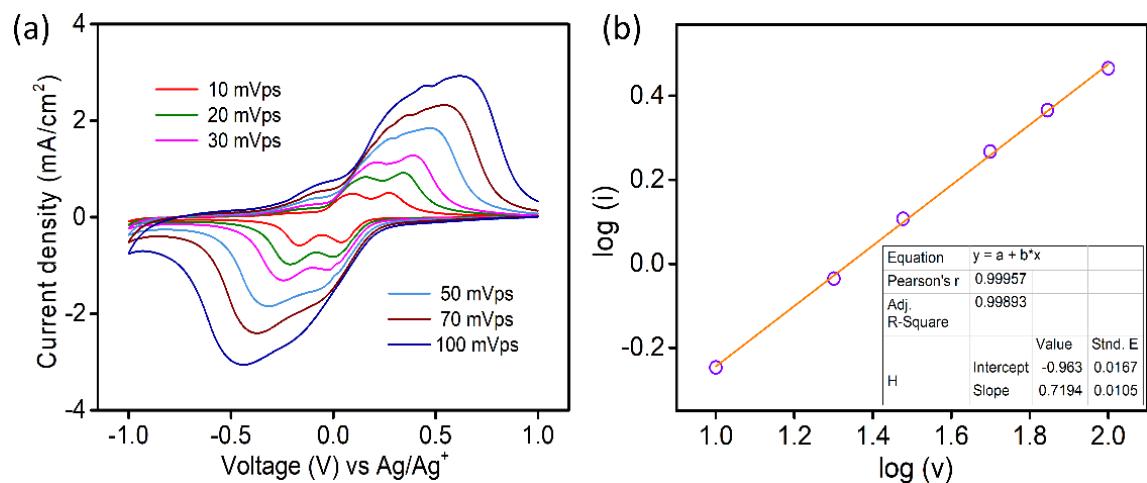


Figure S9: (a) Scan rate dependent CV data and (b) $\log(i)$ vs $\log(v)$ plots for $\text{V}_2\text{O}_5\text{-2}$ electrode

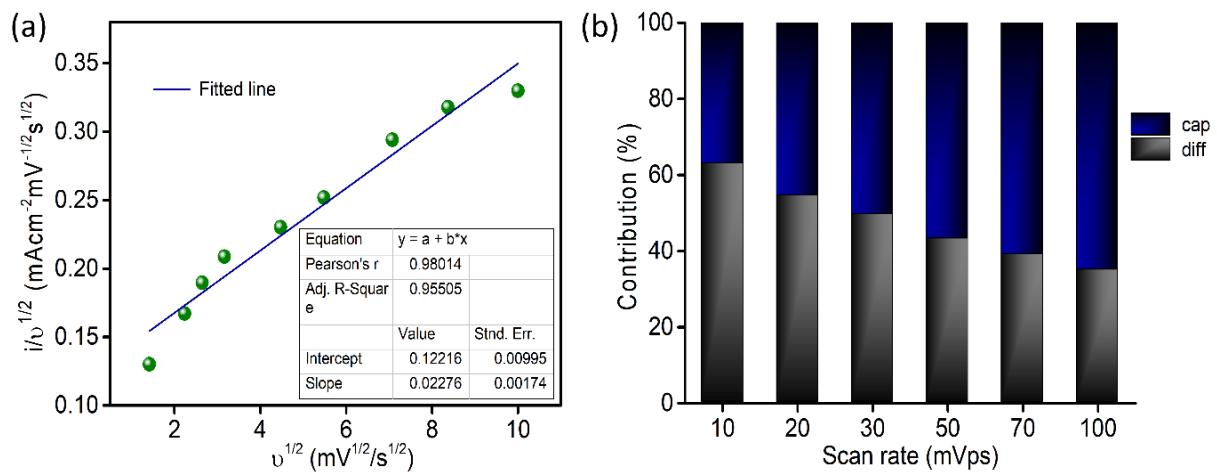


Figure S10: (a) $i/v^{1/2}$ vs $v^{1/2}$ plot for $\text{V}_2\text{O}_5\text{-}1$ electrode and (d) histogram plot shows the decoupling of current contributions with scan rate

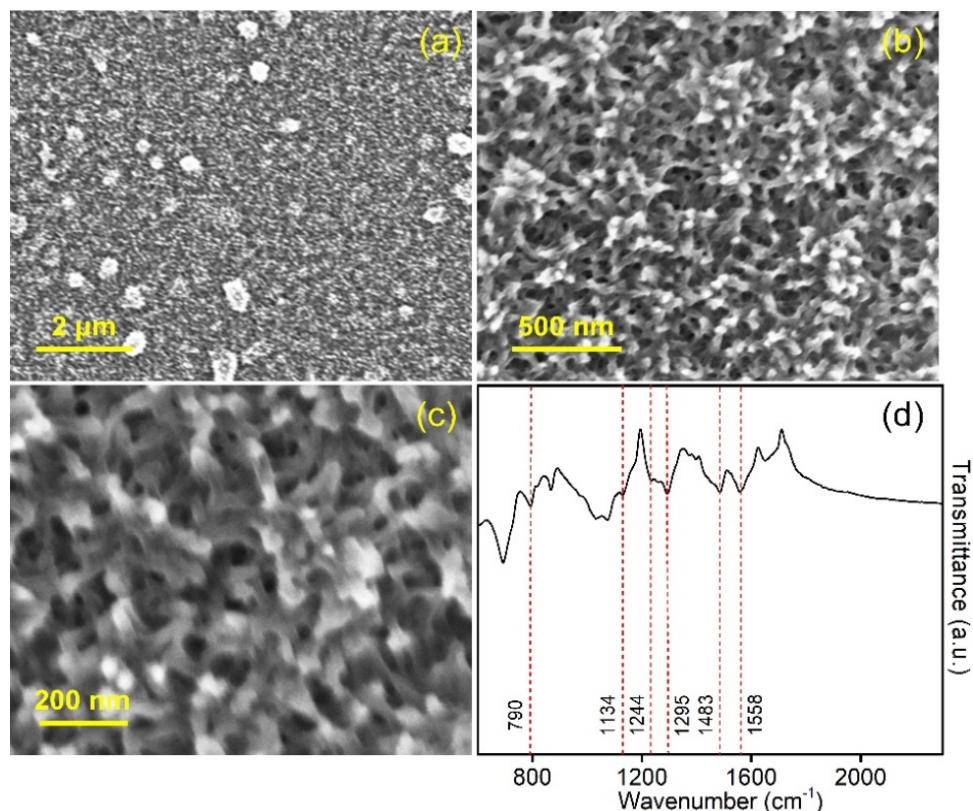


Figure S11: (a)-(c) FESEM images and (d) ATR-FTIR data of as-deposited PANI film

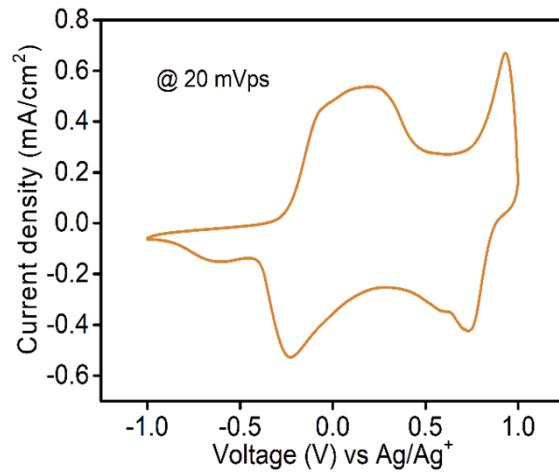


Figure S12: CV of PANI film in three-electrode set-up at 20 mVps scan rate in 1 M LiClO₄/PC electrolyte

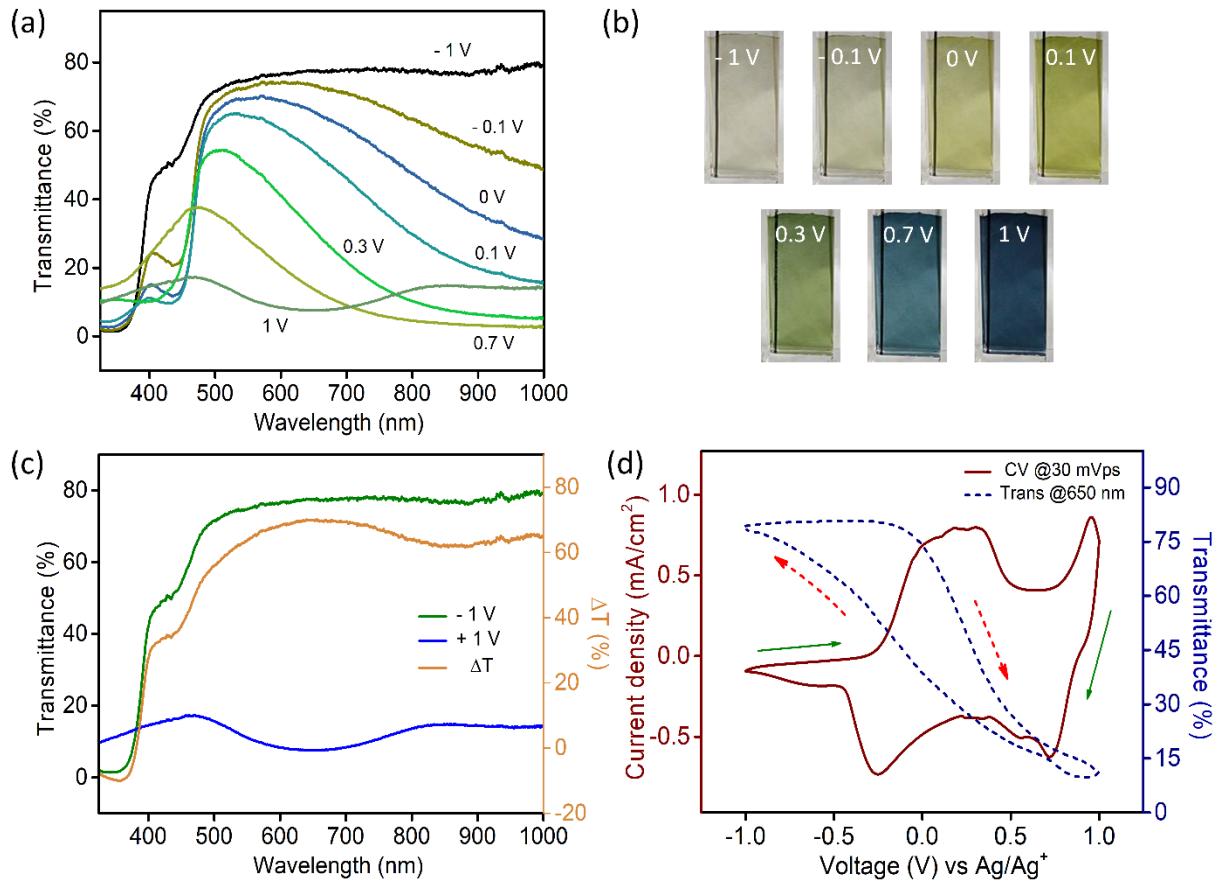


Figure S13: (a) Transmission spectra and (b) digital photographs of PANI electrodes at different applied biases, (c) Transmission data at +1 V and -1 V along with the optical modulation spectra (orange curve); (d) CV data of PANI film (wine curve) at 50 mV/s scan rate as well as the in-situ change in transmission at 650 nm (blue dotted line).

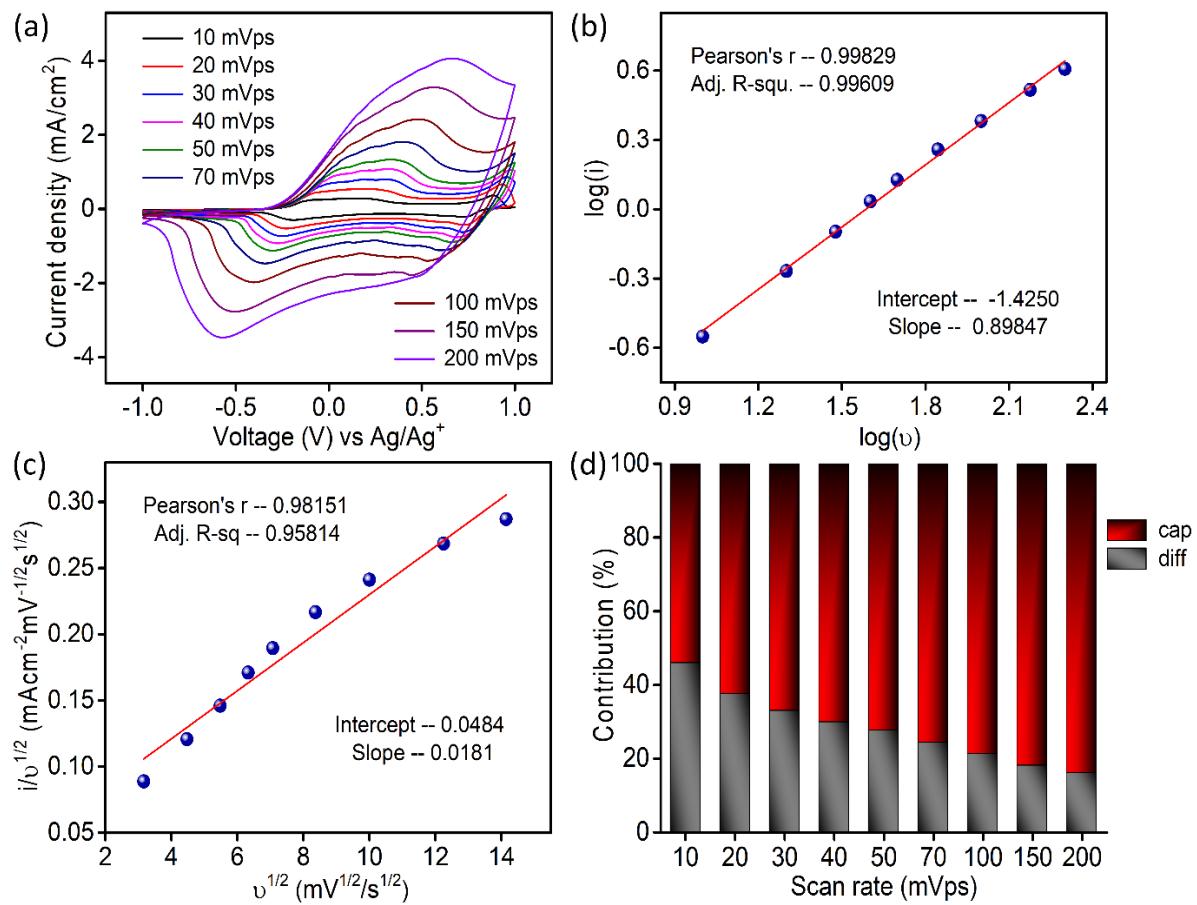


Figure S14: (a) Scan rate dependent CV data for PANI electrode, (b) $\log(i)$ vs $\log(v)$ plot, (c) $i/v^{1/2}$ vs $v^{1/2}$ plot and (d) deconvoluting current contributions with scan rate

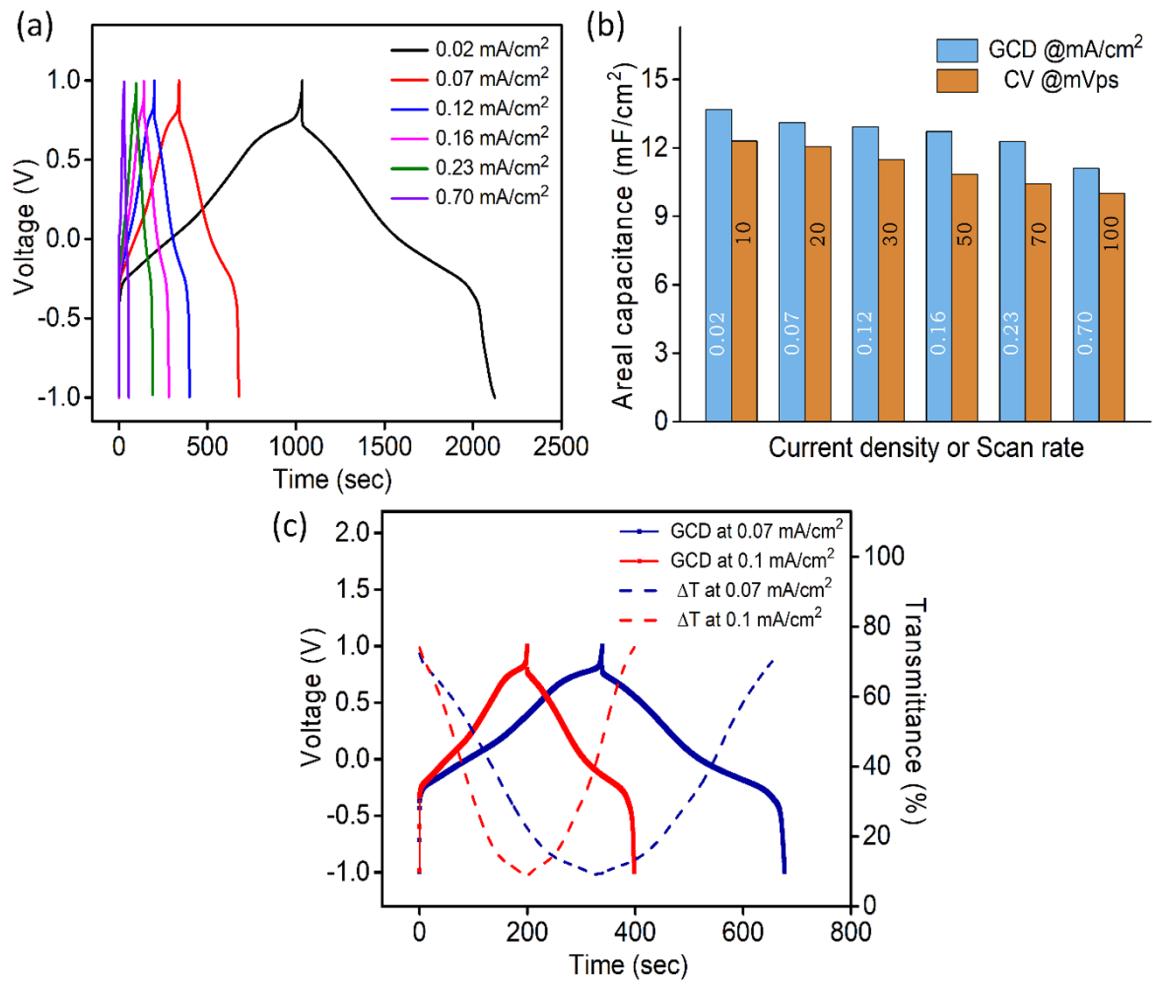


Figure S15: (a) GCD curves at different current densities; (b) comparison of areal specific capacitance values obtained from CV and GCD data; (c) in-situ change in transmittance at 650 nm synced with GCD curves at different current densities.

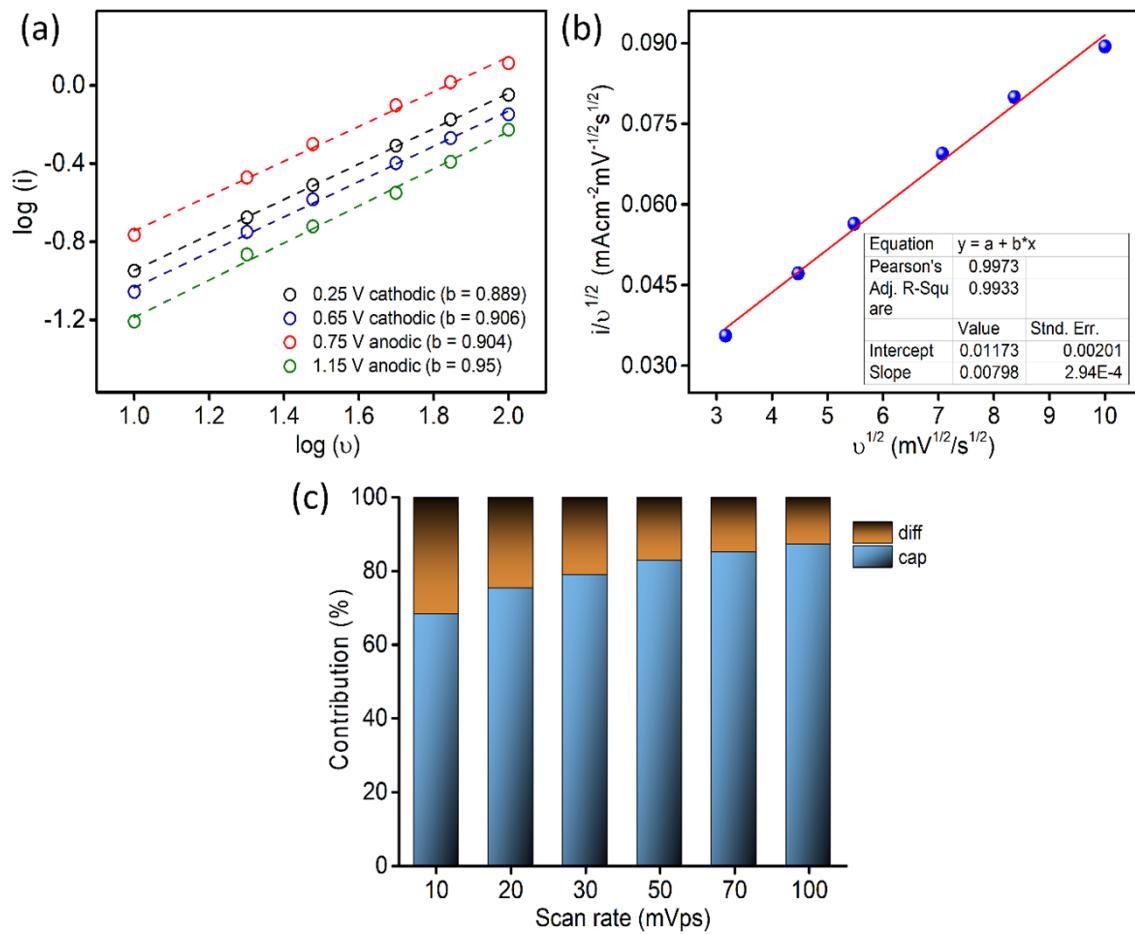


Figure S16: (a) $\log(i)$ vs $\log(v)$ plot for ASC system at different voltages, (b) $i/v^{1/2}$ vs $v^{1/2}$ graph, (c) separating the current contributions at different scan rates

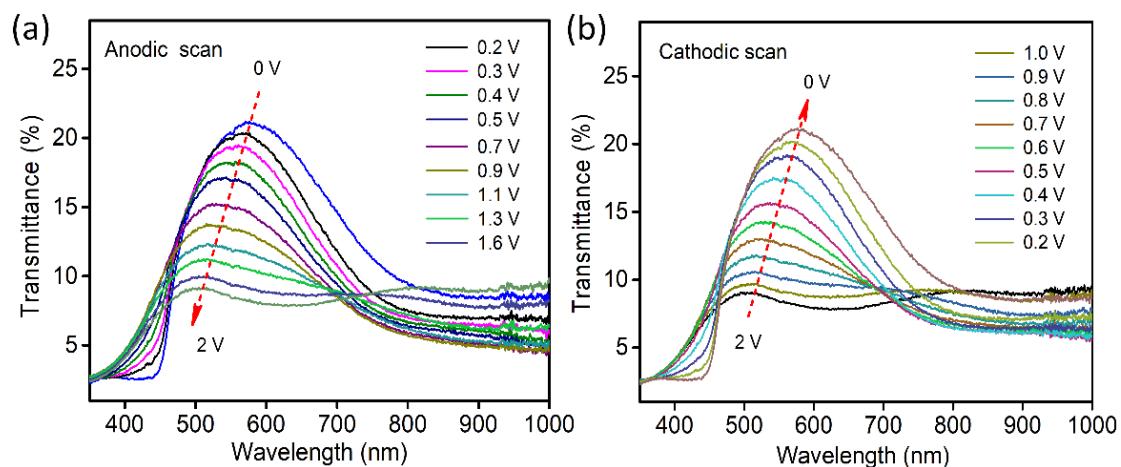


Figure S17: Gradual change in transmission spectra of MECASC during (a) anodic and (b) cathodic scan

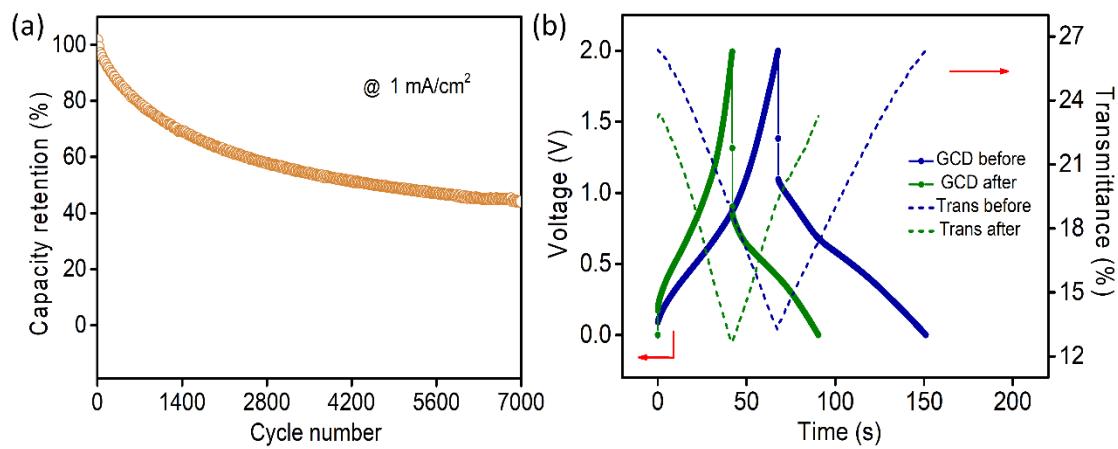


Figure S18: (a) Cycling performance of MECASC up to 7000 cycles; (b) GCD profiles of the system at 0.12 mA/cm^2 and dynamic in-situ transmission modulations at 580 nm before and after cycling

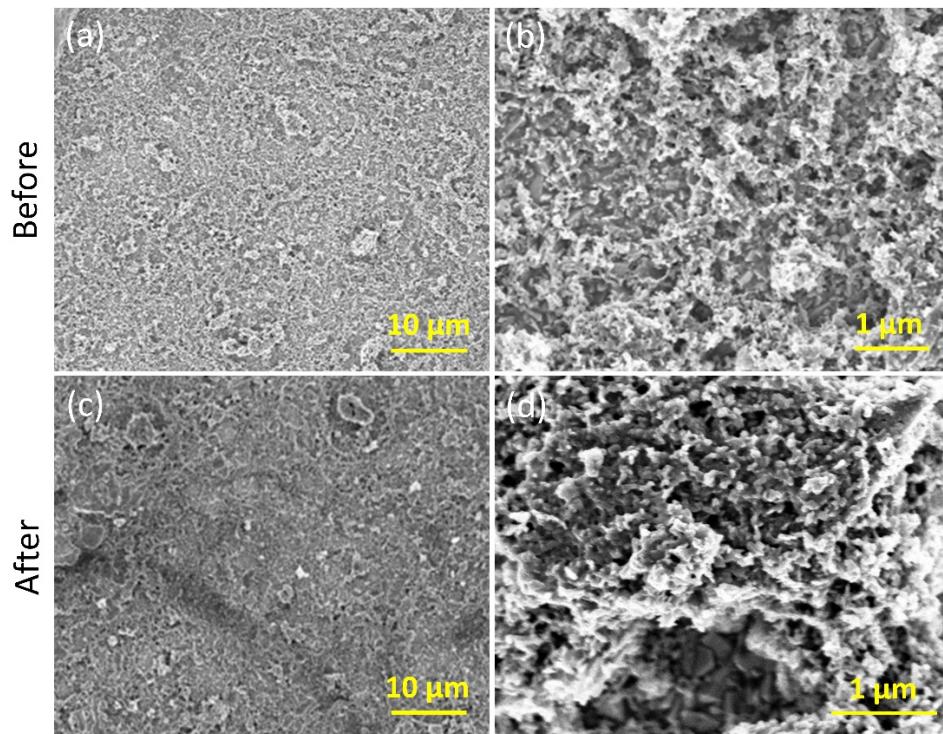


Figure S19: Morphology of V_2O_5 films before (a)-(b) and after (c)-(d) cycling in 2-electrode system at different magnifications

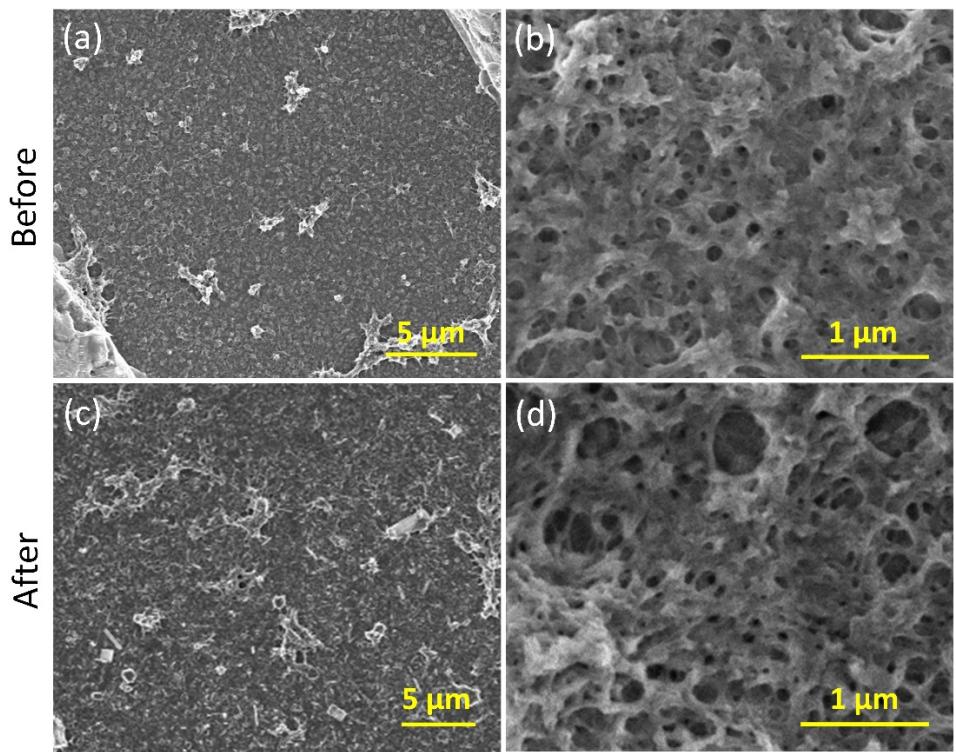


Figure S20: Morphology of PANI films before (a)-(b) and after (c)-(d) cycling in 2-electrode system at different magnifications