Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Diameter-optimized PVA@PPy nanofibers: MXene interlayer space expansion without sacrificing electron transport

Jinli Li[a], Zhiqian Cao[b], Haibo Hu[b] and Derek Ho[a, c*]

[a] Department of Materials Science and Engineering, City University of Hong Kong, Kowloon, Hong Kong, China.

[b] School of Materials Science and Engineering, Key Laboratory of Structure and Functional Regulation of Hybrid Materials, Ministry of education, Anhui University, Hefei, China

[c] Hong Kong Center for Cerebro-Cardiovascular Health Engineering, Hong Kong, China

E-mail: derekho@cityu.edu.hk

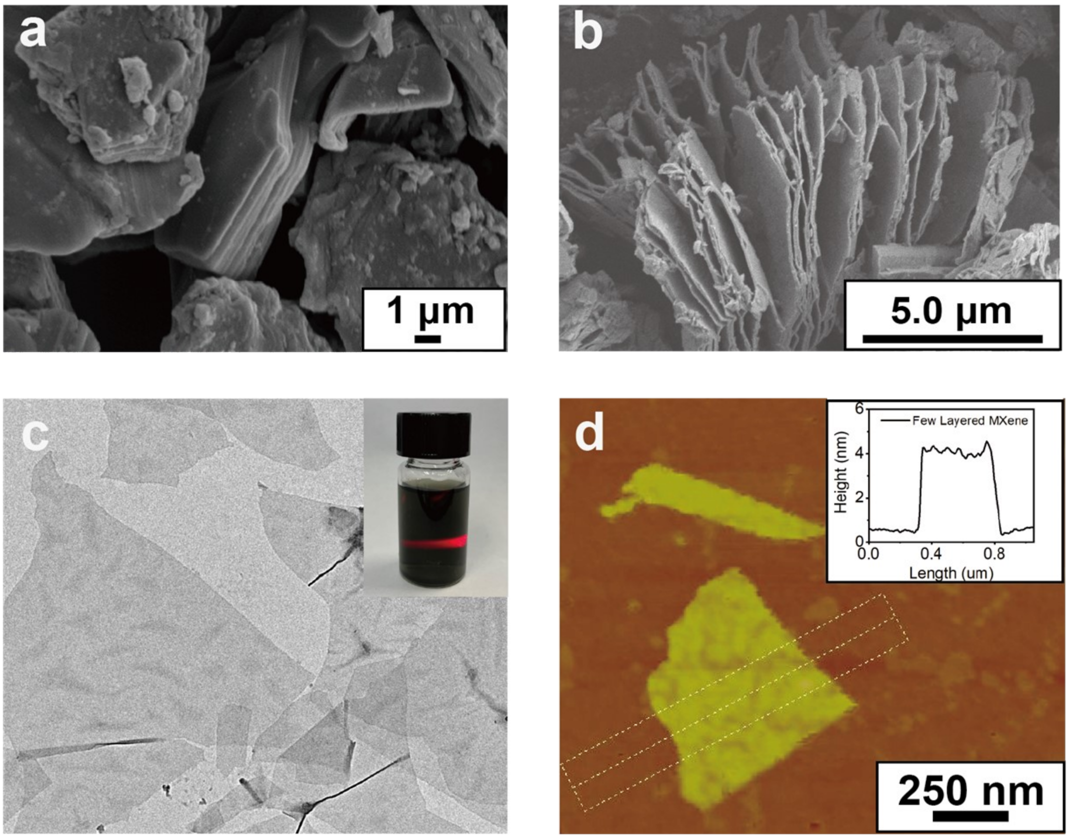

Figure S1. SEM of (a) Ti_3AlC_2 MAX phase precursor (b) etched multi-layered MXene (c) TEM image of few-layered MXene sheet and (d) corresponding AFM image.

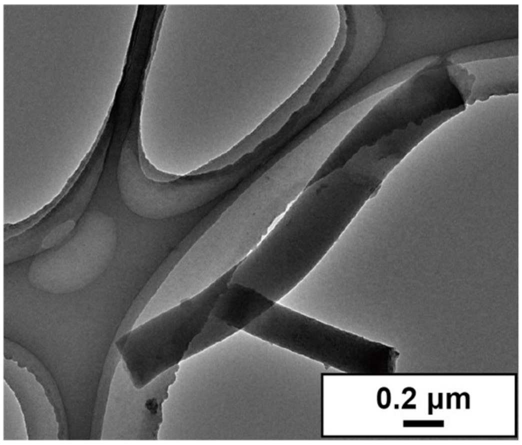

Figure S2. SEM image of annealed PVA nanofibers before coated using PPy.

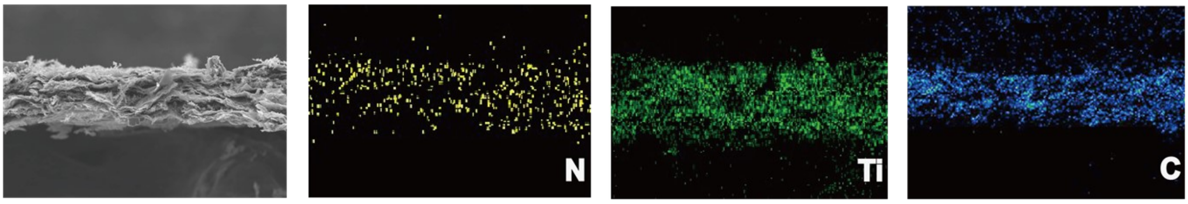

Figure S3. SEM and elemental mappings of N, Ti, and C within the MXene/PVA@PPy-L hybrid film.

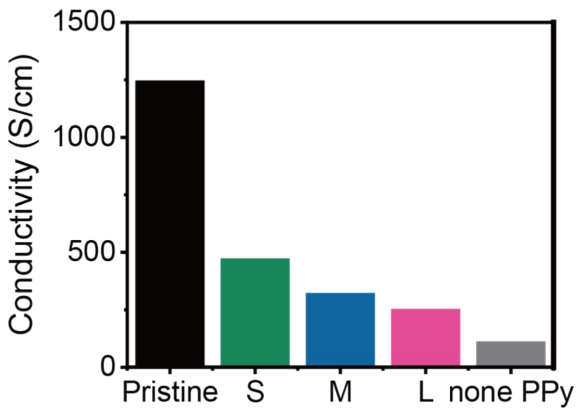

Figure S4. Electrical conductivity of pristine MXene thin-film and MXene/PVA@PPy hybrid films of different diameters – small (S), medium (M), and large (L) and MXene/PVA hybrid film.

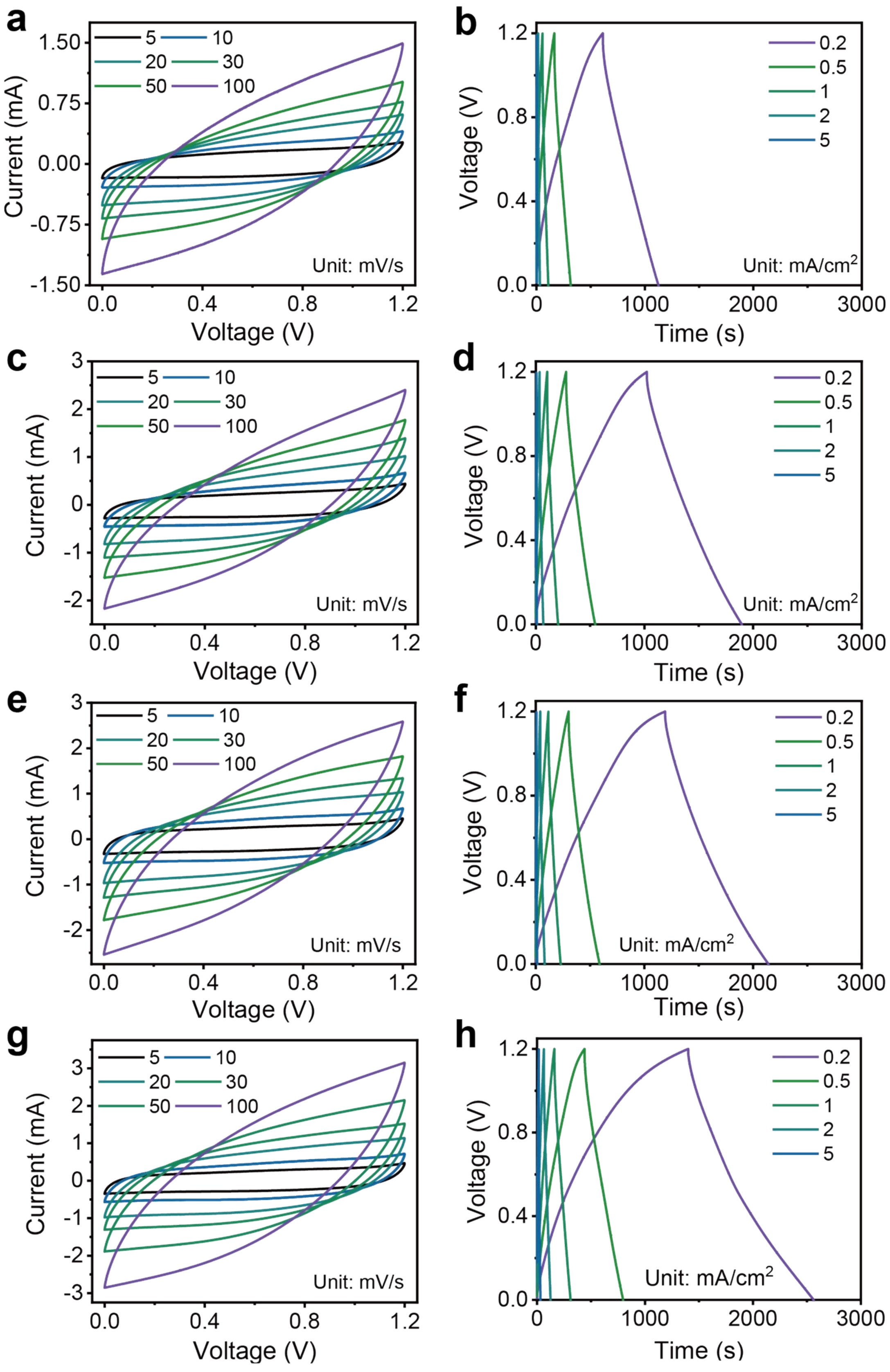

Figure S5. CV profiles of the micro-supercapacitor units employing (a) pristine MXene film, (c) MXene/PVA/PPy-S, (e) MXene/PVA@PPy-M and (g) MXene/PVA@PPy-L across various scanning rates, and (b,d,f,h) the corresponding GCD profiles.

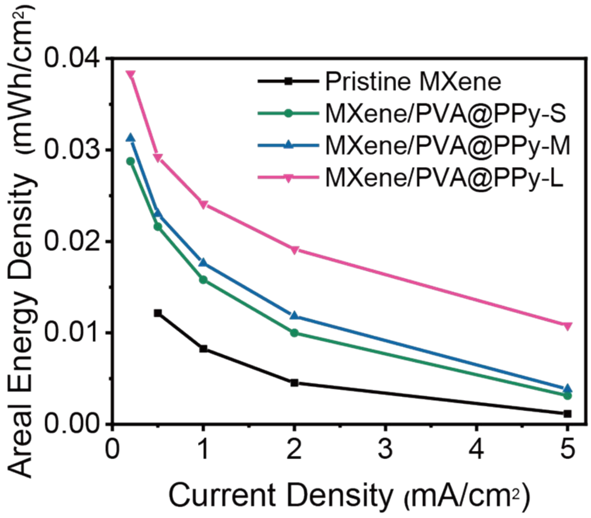

Figure S6. Areal energy density of the as-fabricated ZMSCs based on pristine MXene film and MXene/PVA@PPy hybrid film electrodes employing PVA@PPy nanofibers with three different diameters.

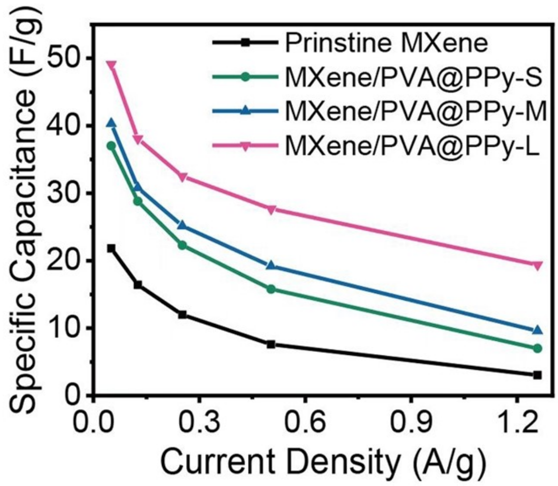

Figure S7. Specific capacitance of the as-fabricated ZMSCs based on pristine MXene film and MXene/PVA@PPy hybrid film electrodes employing PVA@PPy nanofibers with three different diameters versus current densities.

Table S1 Performance of recently reported advanced MXene based symmetrical and asymmetrical micro-supercapacitors.

Electrodes	Electrolyte	Voltage Windows[V]	Areal Capacitance [mF/cm^2]	Areal Energy Density [μWh/cm^2]	Areal Power Density [mW/cm^2]	Ref.
			Symmetrical			
MXene/PVA@PPy	1M $Zn(CF_3SO_3)_2$/PAM	0-1.2	195	Max: 38.4 Min:10.8	Max:2.51 Min:0.119	**This work**
Be^{2+}-MXene	Gelatin/$ZnSO_4$	0-0.6	77.2	3.86	0.12	1
MXene-Mg^{2+}	3M H_2SO_4/PVA	0-0.6	409	Max:21.6 Min:7.4	Max:1.1 Min:0.1	2
MXene/BC@PPy	1M H_2SO_4/PVA	0-0.6	200	10	---	3
MXene/BCF	1M $Zn(CF_3SO_3)_2$/PAM	0-1.2	179	34	---	4
MXene/BC	1M H_2SO_4/PVA	0-0.6	112	5.54	0.114	5
MXene/MPFs	1M H_2SO_4/PVA	0-0.6	408	20.4	0.15	6
MXene	3M H_2SO_4/PVA	0-0.6	61.7	0.76	0.33	7
Screen-printed MXene	3M H_2SO_4/PVA	0-0.6	158	40.5	0.26	8
MXene	H_2SO_4/PVA	0-0.5	43	0.32	0.158	9
			Asymmetrical			
CNT@PPy//MXene	3M H_2SO_4/PVA	0-1.4	150	40.5	---	10
MXene//Co-Al-LDH	PVA/KOH	0.4-1.45	40	8.84	0.23	11
RuO2//MXene	1M H_2SO_4/PVA	0-1.5	60	19	1.5	12
MXene/AC	Na_2SO_4/PVA	0-1.6	7.8	3.5/mWh/cm^3	100/mW/cm^3	13
ZIF-C//NiCoP@NiOOH	PVA/KOH	0-1.4	54.7	13.9	0.27	14

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