

ADVANCED ENERGY MATERIALS

Supporting Information

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Interwoven Nanowire Based On-Chip Asymmetric
Microsupercapacitor with High Integrability, Areal Energy,
and Power Density

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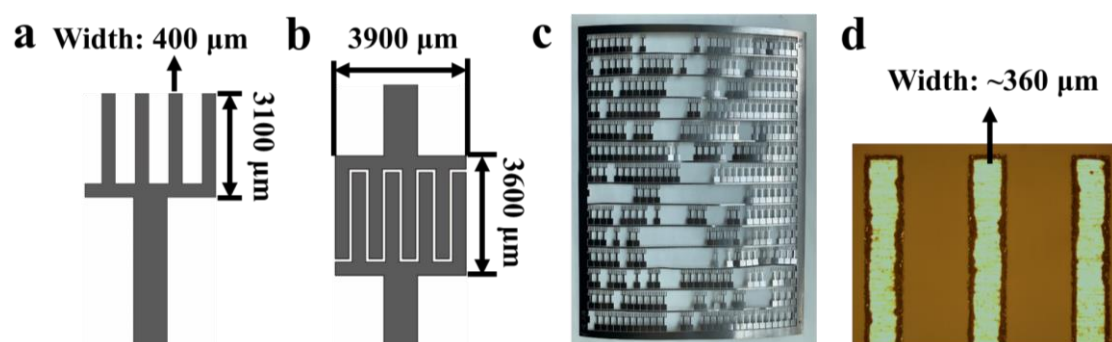


Figure S1. The microelectrode projection showing the design of (a) single electrode, and (b) full device. (c) Fine patterned Ti microelectrodes fabricated by large-scale wet etching (Fabricated by Shaoxing Hua Li Electronics Co., Ltd, the thickness of raw Ti foil is 100 μm). (d) Bright-field optical image of the bare Ti microelectrodes (the fingers become narrow because of lateral etching during the fabrication process).

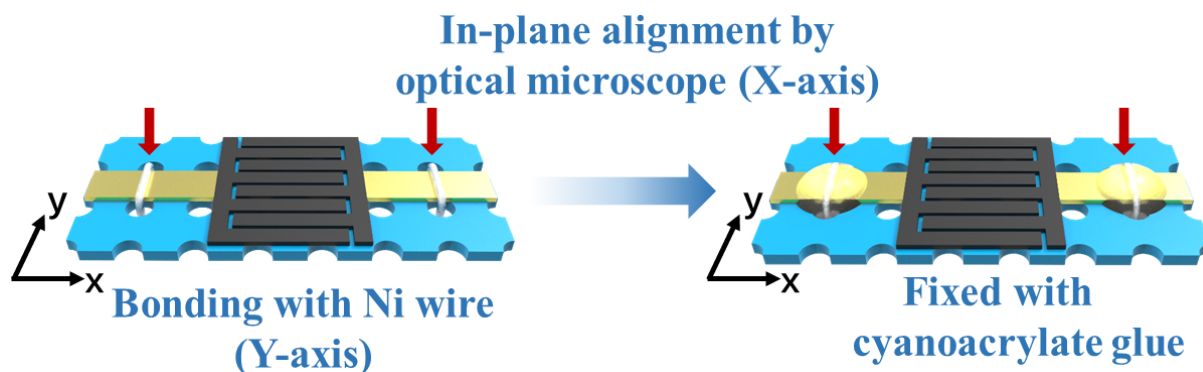


Figure S2. Schematic of the assembly process of cathode and anode on the PCB.

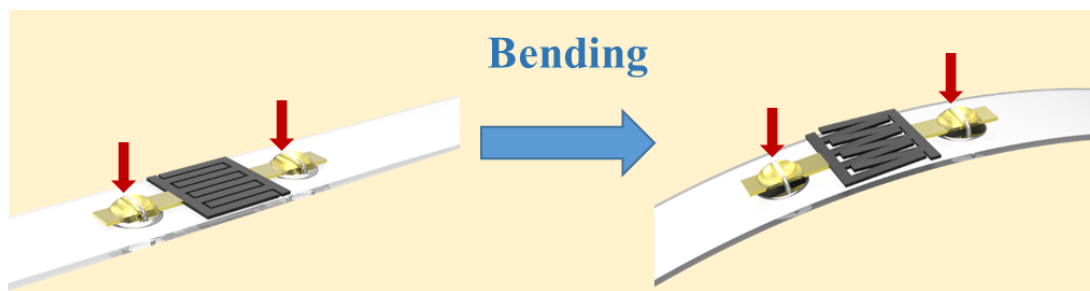


Figure S3. Schematic illustration of compatibility of microelectrodes on flexible PET bangle.

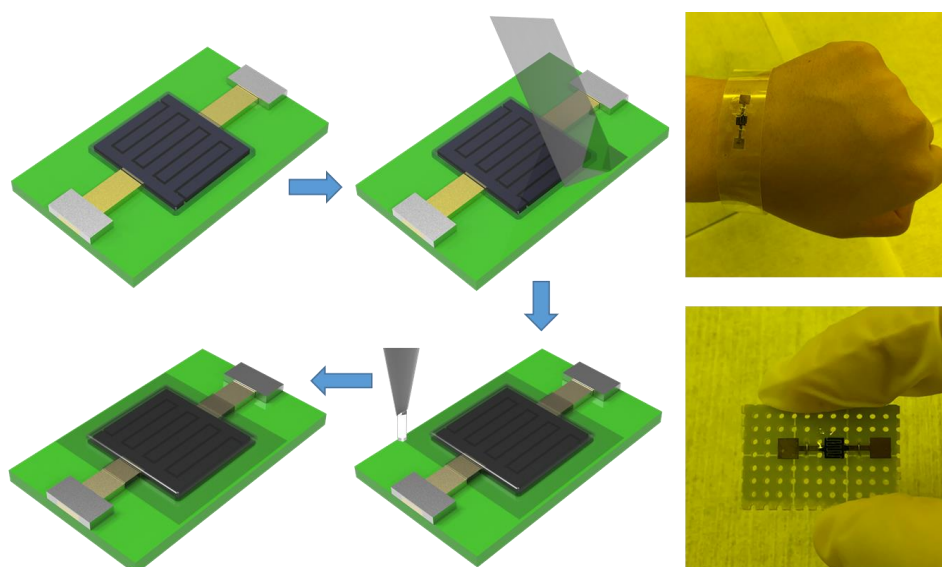


Figure S4. Schematic illustration and optical images of AMSC with PE packaging.

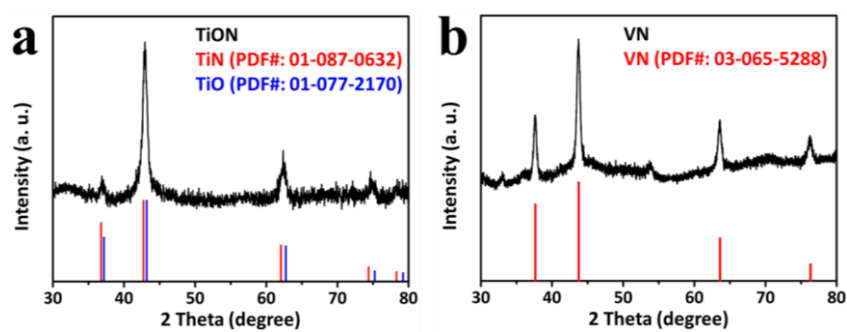


Figure S5. XRD patterns of (a) TiON and (b) VN (powder samples).

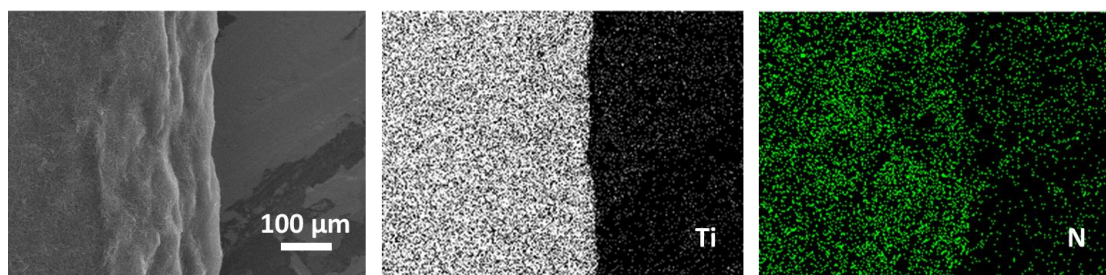


Figure S6. SEM image and the corresponding Ti (white) and N (green) elemental mappings of an edge side of TiON NW microelectrode.

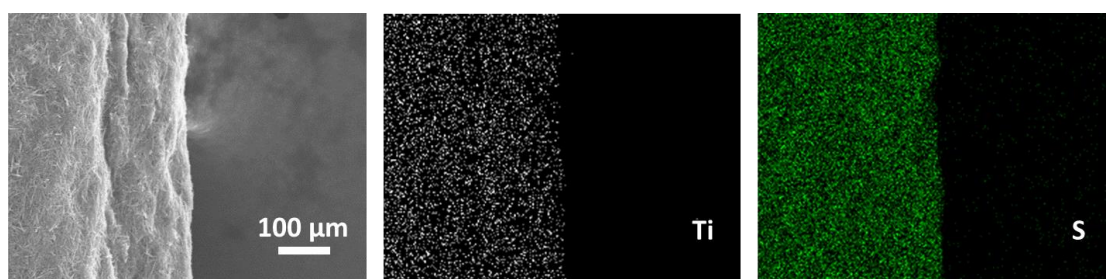


Figure S7. SEM image and the corresponding Ti (white) and S (green) elemental mappings of an edge side of P-TiON NW microelectrode.

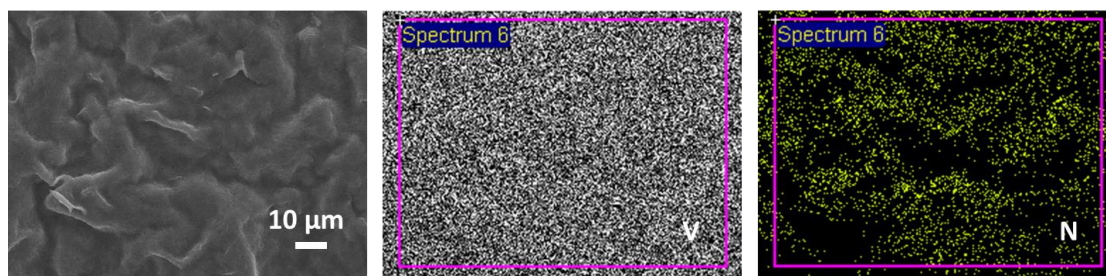


Figure S8. SEM image and the corresponding V (white) and N (yellow) elemental mappings of an edge side of VN NW microelectrode.

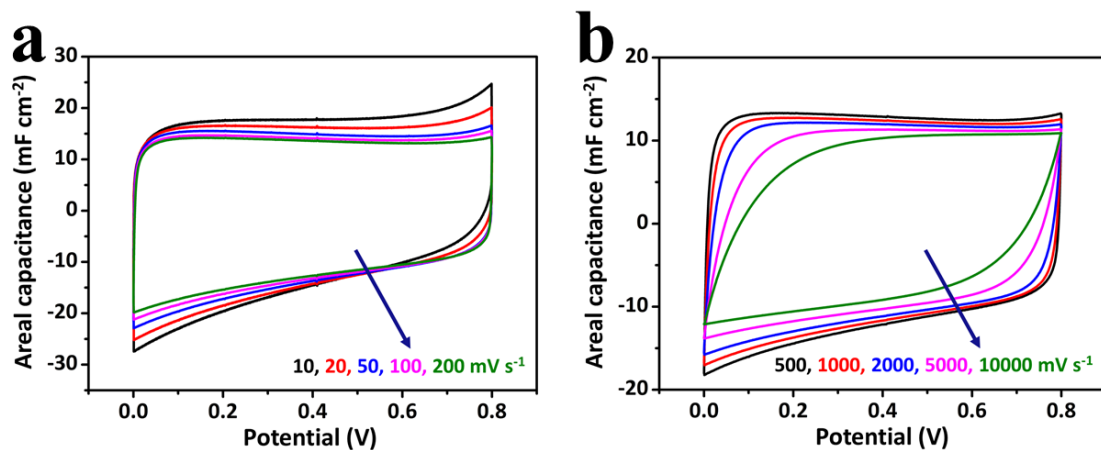


Figure S9. Different CV curves of TiON NW microelectrode ranging from (a) 10 to 200 mV s^{-1} , and (b) 500 to 10000 mV s^{-1} .

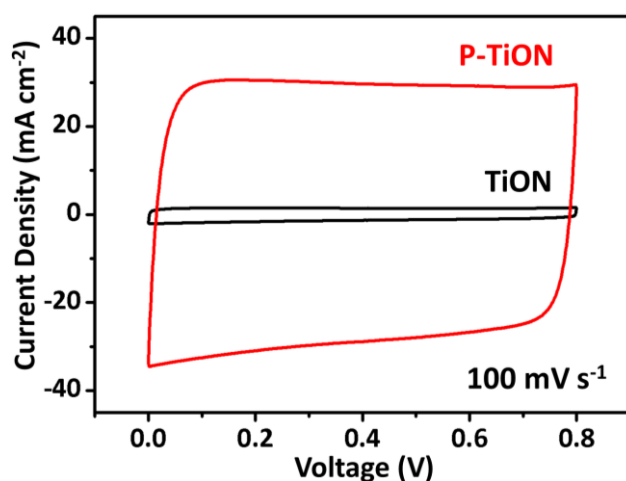


Figure S10. CV curves of P-TiON and TiON NW microelectrodes at 100 mV s^{-1} .

Table S1. Comparison of the maximal current density capacitance retention between P-TiON//VN AMSC in this work and other reported MSCs/AMSCs.

MSCs/AMSCs	Voltage window (V)	Current density ranging (mA cm^{-2})	Capacitance retention	Reference
ITO NWs@MnO ₂ MSC	0 to 1	0.5 to 10	54.9%	[S1]
3D Ti ₃ C ₂ T _x MSC	0 to 0.6	2 to 44	47%	[S2]

MoS ₂ @rGO-CNT MSC	0 to 1	0.1 to 2	68%	[S3]
VO _x /rGO// G-VNQDs/rGO AMSC	0 to 1.6	0.63 to 4.71	58.3%	[S4]
VN NSAs/CNTF// Na-MnO _x /NCF/CNTF AMSC	0 to 2.4	1 to 10	71%	[S5]
Ppy@MWCNT// MnO ₂ @Ppy@MWCNT AMSC	0 to 1.6	0.1 to 0.5	81%	[S6]
P-TiON//VN AMSC	0 to 1.8	1 to 50	68%	This work

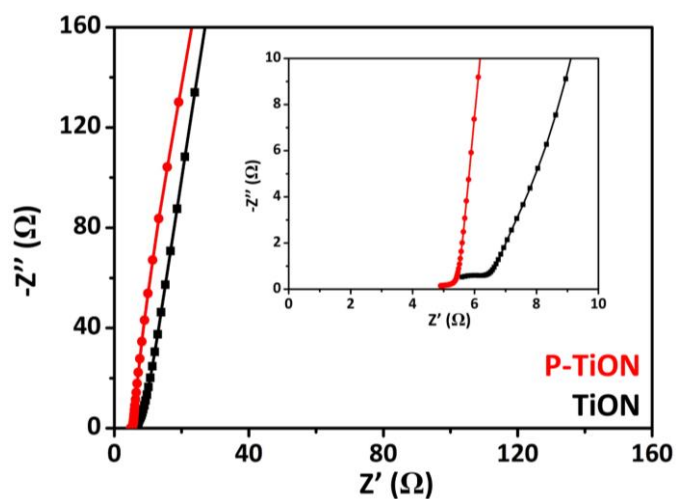


Figure S11. The Nyquist plots of the TiON and P-TiON NW microelectrodes.

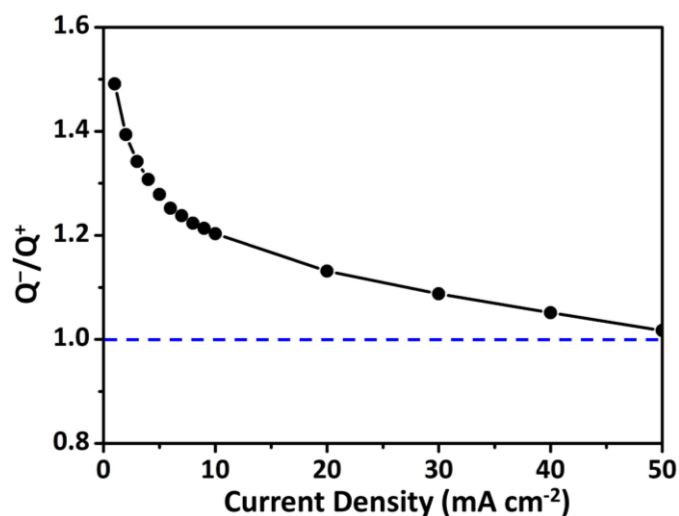


Figure S12. The values of Q^-/Q^+ of the areal charge of the anode and cathode

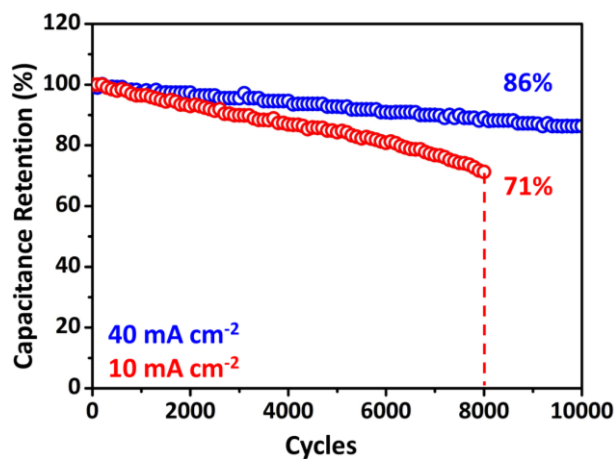


Figure S13. Cycling performance of the P-TiON//VN AMSC collected at current densities of 40 mA cm⁻² for 10000 cycles and 10 mA cm⁻² for 8000 cycles.

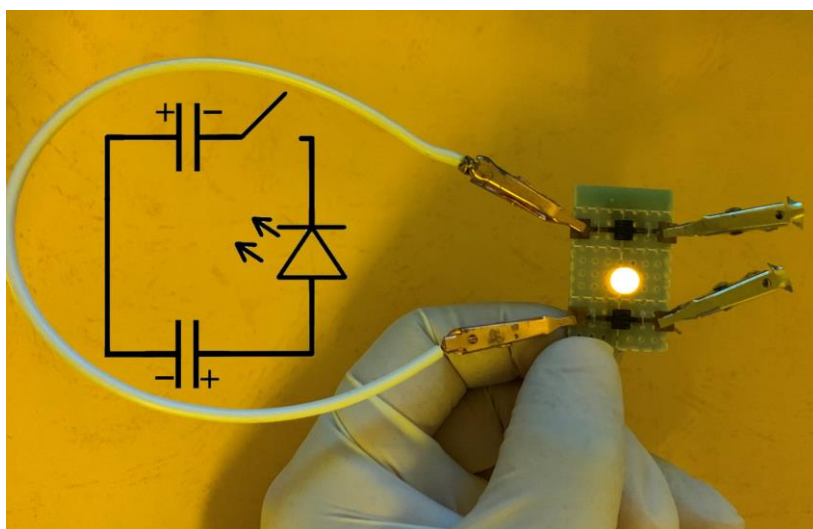


Figure S14. Photograph and circuit diagram of the integrated system.

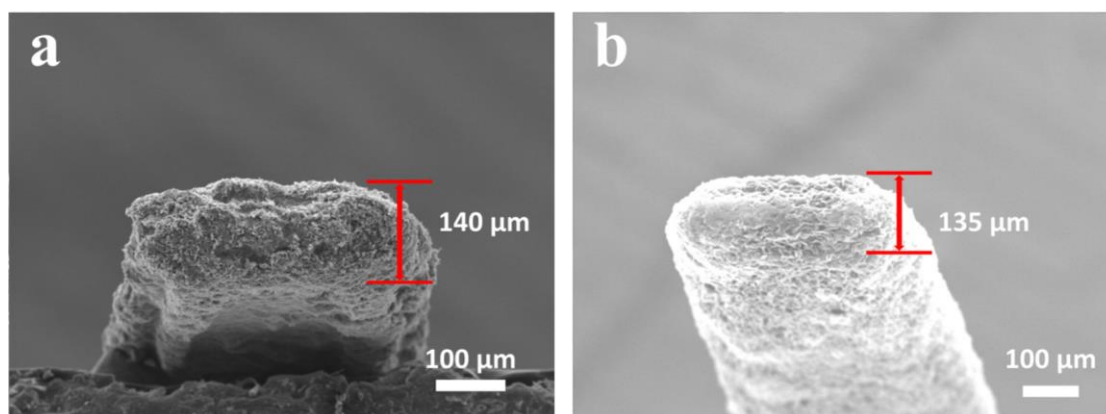


Figure S15. The cross-section SEM images of (a) P-TiON and (b) VN NW microelectrodes.

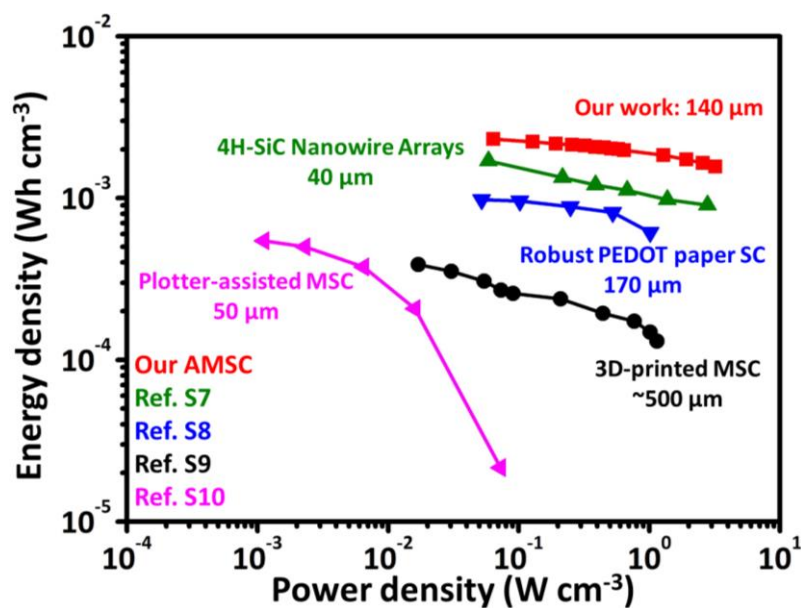


Figure S16. Ragone plots showing the volumetric energy/power density of AMSC in comparison with other reported AMSCs and MSCs with high mass loading.

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