

Supporting Information for

Solution-processable hierarchical SiNWs/PEDOT/MnO_x electrodes for high-performance supercapacitors

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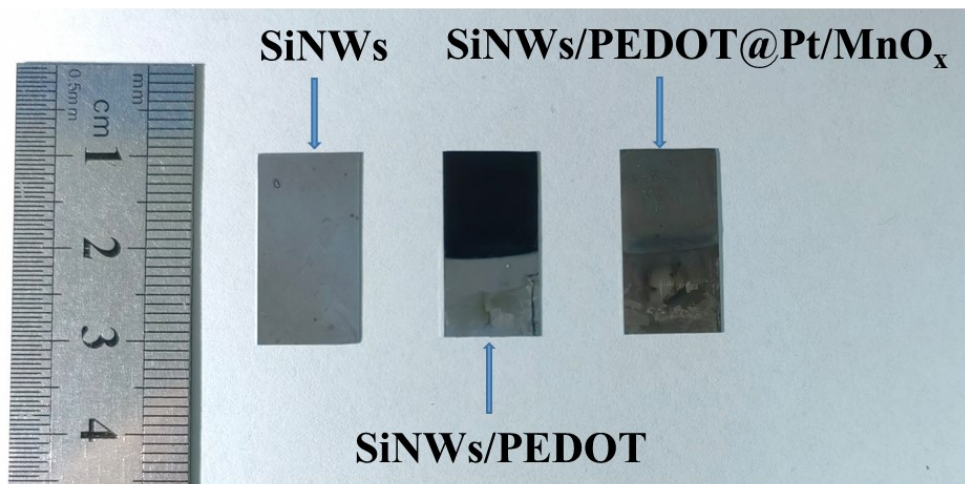


Fig. S1. Photos of different composites.

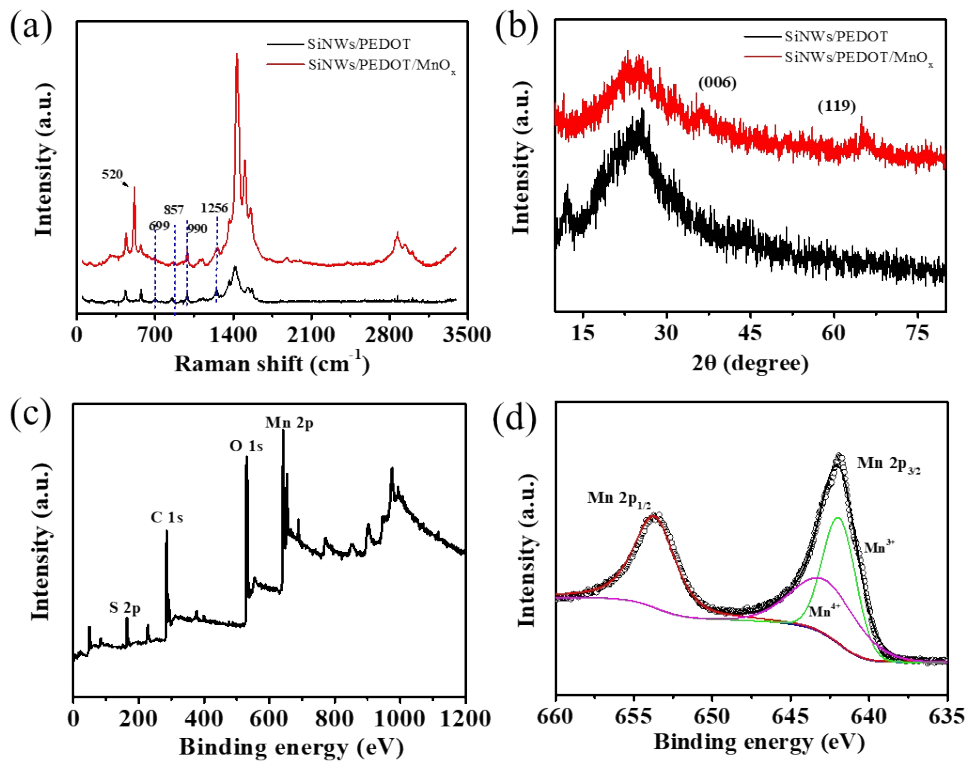


Fig. S2. (a) Raman data and (b) X-ray diffraction of SiNWs/PEDOT and SiNWs/PEDOT/MnO_x; (c) XPS survey spectra and (d) Mn 2P region of XPS spectrum obtained from SiNWs/PEDOT/MnO_x.

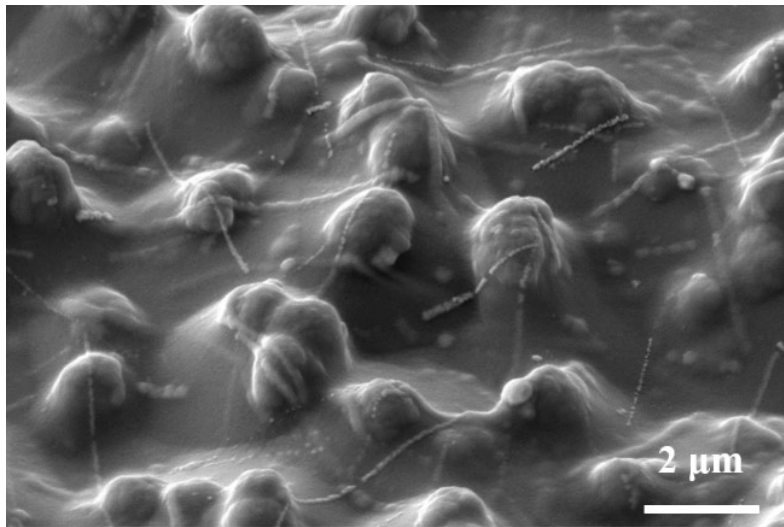


Fig. S3. 45 degree angle SEM image of SiNWs/PEDOT@Pt/MnO_x electrode.

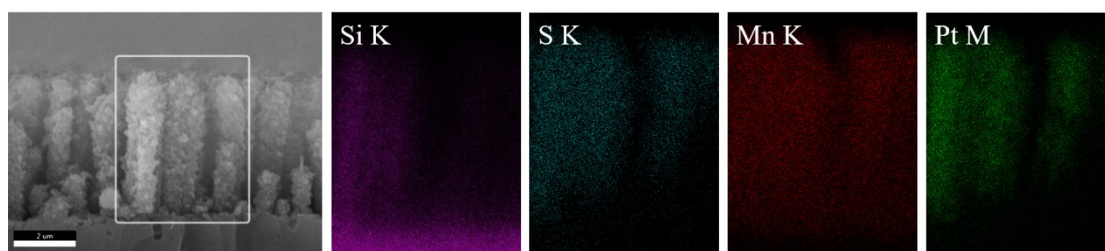


Fig. S4. SEM image of the SiNWs/PEDOT@Pt/MnO_x composite and corresponding

EDS elemental mapping of Si, S, Mn, and Pt.

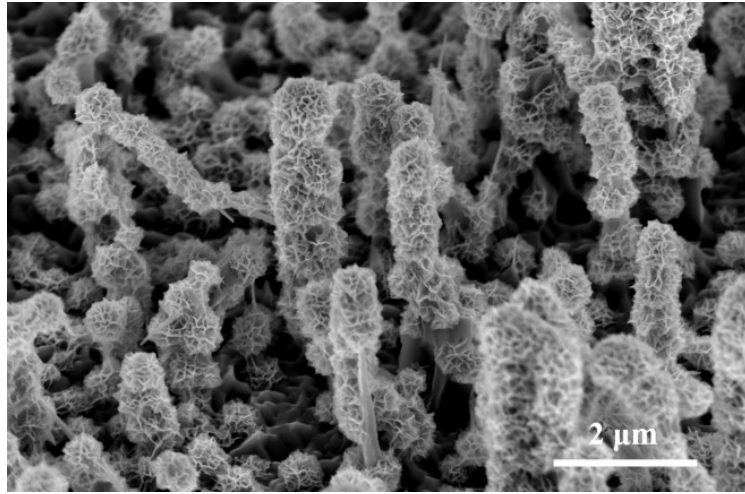


Fig. S5. SEM of SiNWs/MnO_x.

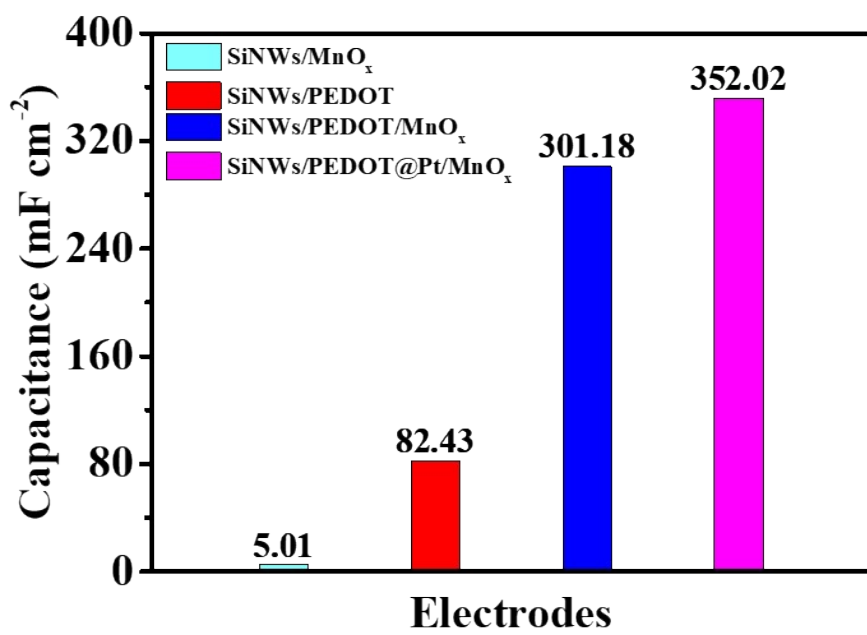


Fig. S6. Areal capacitance values of different electrodes at 2 mA cm⁻².

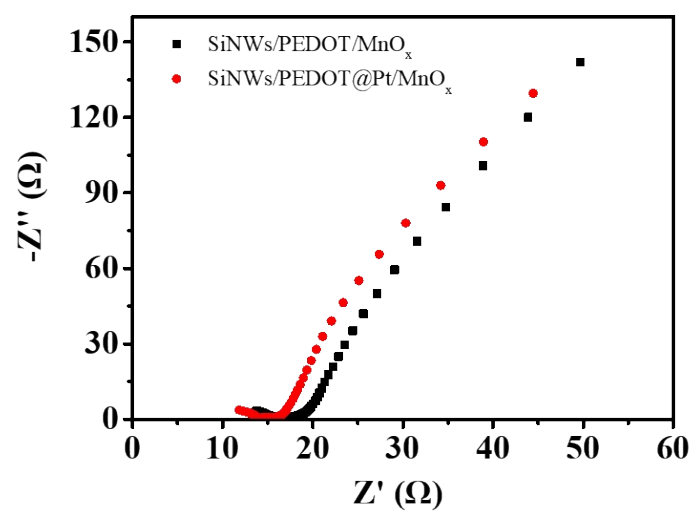


Fig. S7. EIS spectra of SiNWs/PEDOT/MnO_x and $\text{SiNWs/PEDOT@Pt/MnO}_x$ electrodes

in 1 M Na_2SO_4 .

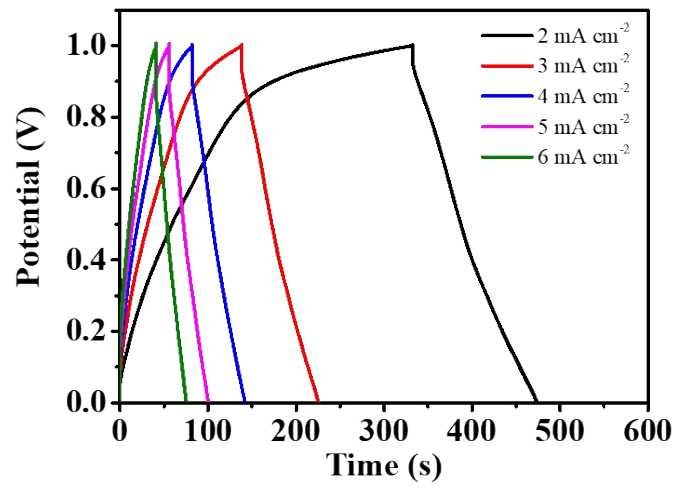


Fig. S8. GCD curves under different current densities from 2 to 6 mA cm⁻² for the SiNWs/PEDOT/MnO_x electrode.

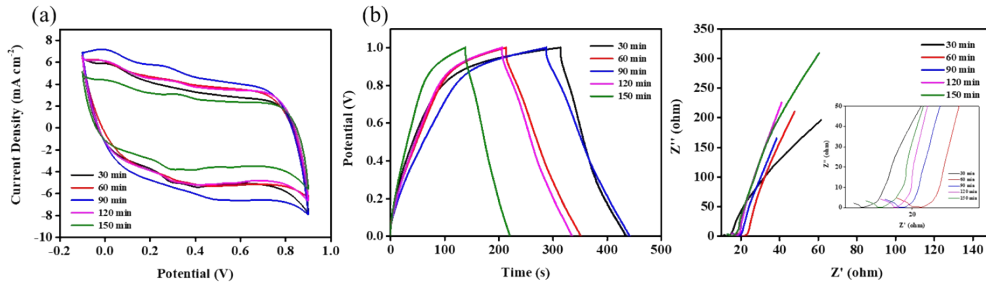


Fig. S9. Electrochemical performances of SiNWs/PEDOT/MnO_x electrodes prepared with electrodeposition times of PEDOT for 15 min dipped in 15 mM KMnO₄ for 50 min. (a) CV curves at the scan rate of 20 mV s⁻¹, (b) GCD curves at the current density of 2 mA cm⁻², (c) EIS spectra.

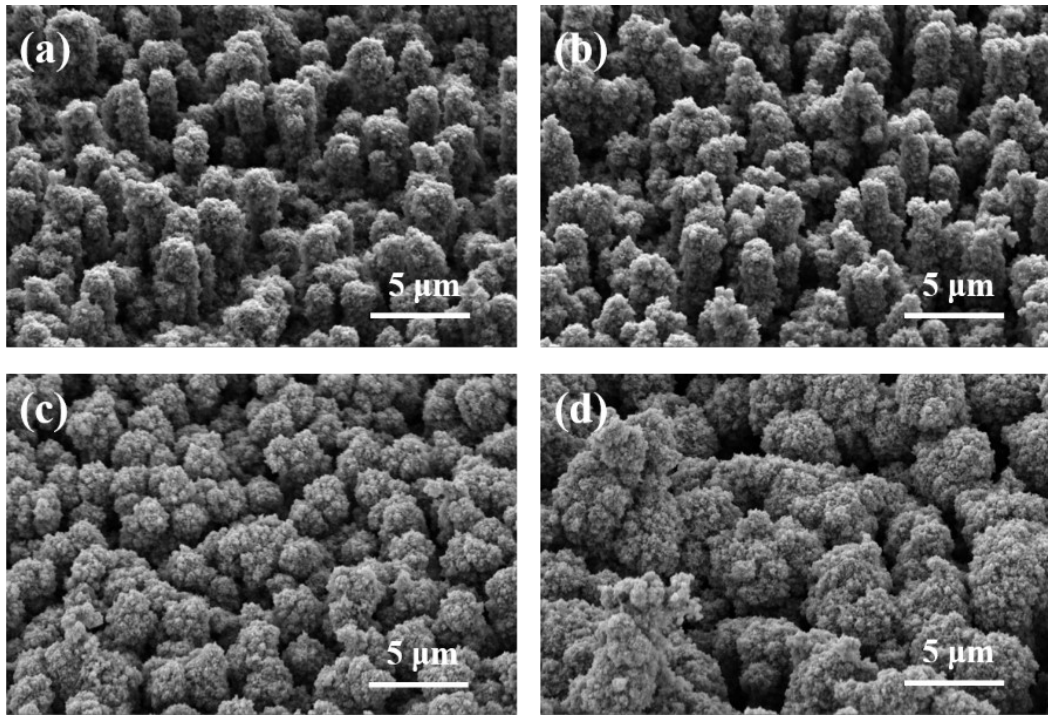


Fig. S10. SEM images of SiNWs/PEDOT prepared with electrodeposition times (a) 10min, (b) 15min, (c) 20min, (d) 25min.

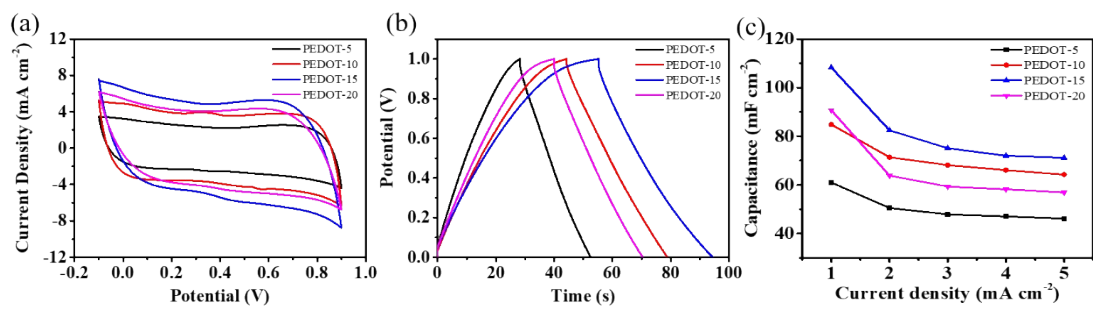


Fig. S11. Electrochemical performances of SiNWs/PEDOT electrodes prepared with electrodeposition times of PEDOT. (a) CV curves at the scan rate of 50 mV s^{-1} , (b) GCD curves at the current density of 2 mA cm^{-2} , (c) Area capacitance of each electrode at different current densities was calculated according to GCD curve.

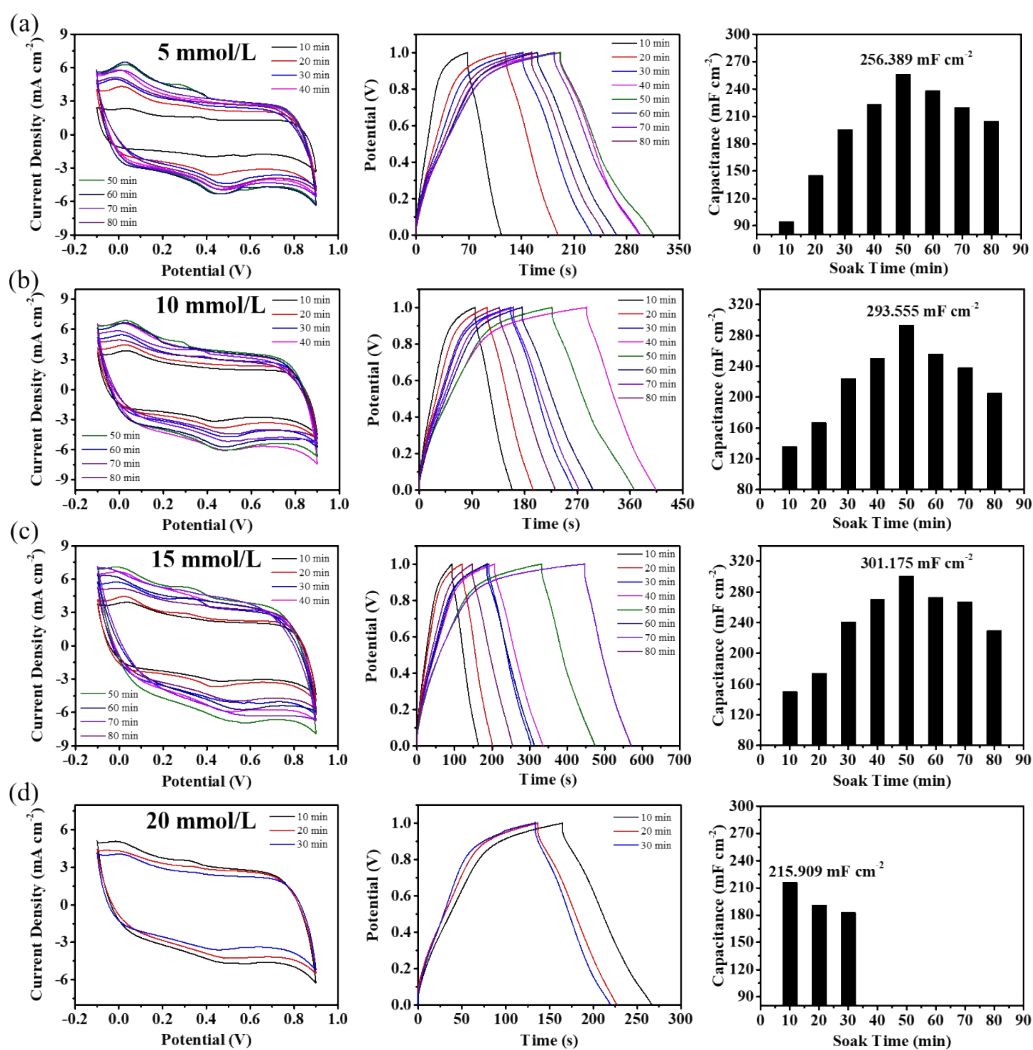


Fig. S12. Electrochemical performances of SiNWs/PEDOT/MnO_x electrodes prepared with electrodeposition times of PEDOT for 15 and dipped in different concentration KMnO₄ for various time. (a) 5 mM, (b) 10 mM, (c) 15 mM and (d) 20 mM.

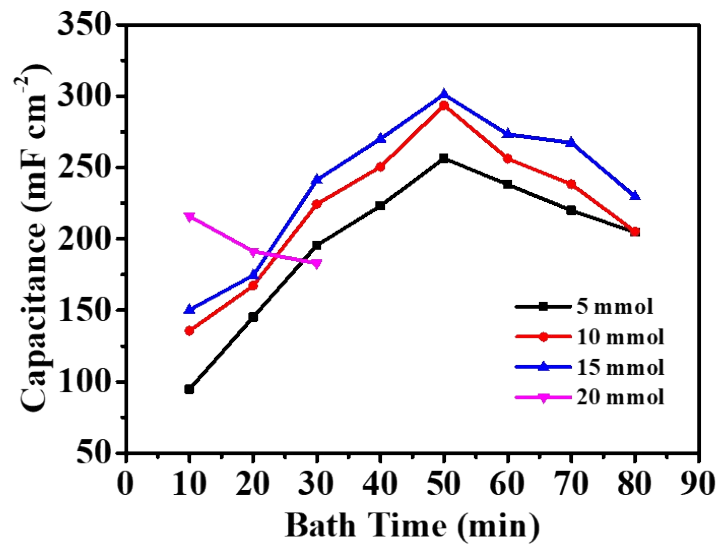


Fig. S13. Areal capacitance values of the SiNWs/PEDOT/MnO_x electrodes with different KMnO₄ concentrations along with the bath time.

Table S1 Performance comparison of Si/PEDOT@Pt/MnO_x symmetry capacitor with previous devices.

System	Electrolyte	E(mWh/cm ²)	P(mW/cm ²)	Refs
PEDOT/PPy/SiNWs	PYR ₁₃ TFSI	0.0146	0.315	1
PEDOT/D/SiNWs	N ₁₁₁₄ TFSI	0.007	1.3	2
PEDOT coated SiNWs	N ₁₁₁₄ TFSI	0.0092	0.11	3
MnO _x /C/PSiNW	0.1M EMIM-TFSI	0.555	0.48	4
MnO ₂ /SiNWs	PYR ₁₃ TFSI/ LiClO ₄	0.0091	0.388	5
Si-TNR/TiN/ MnO ₂	1M Na ₂ SO ₄	0.003	0.1	6
SiNWs@MnO ₂	1M Na ₂ SO ₄	3.34×10 ⁻⁵	0.14	7
MnO _x /PEDOT/SiNWs	1M Na ₂ SO ₄	0.0409	0.524	This Work
	PVA/ Na ₂ SO ₄	0.0133	0.275	

References

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