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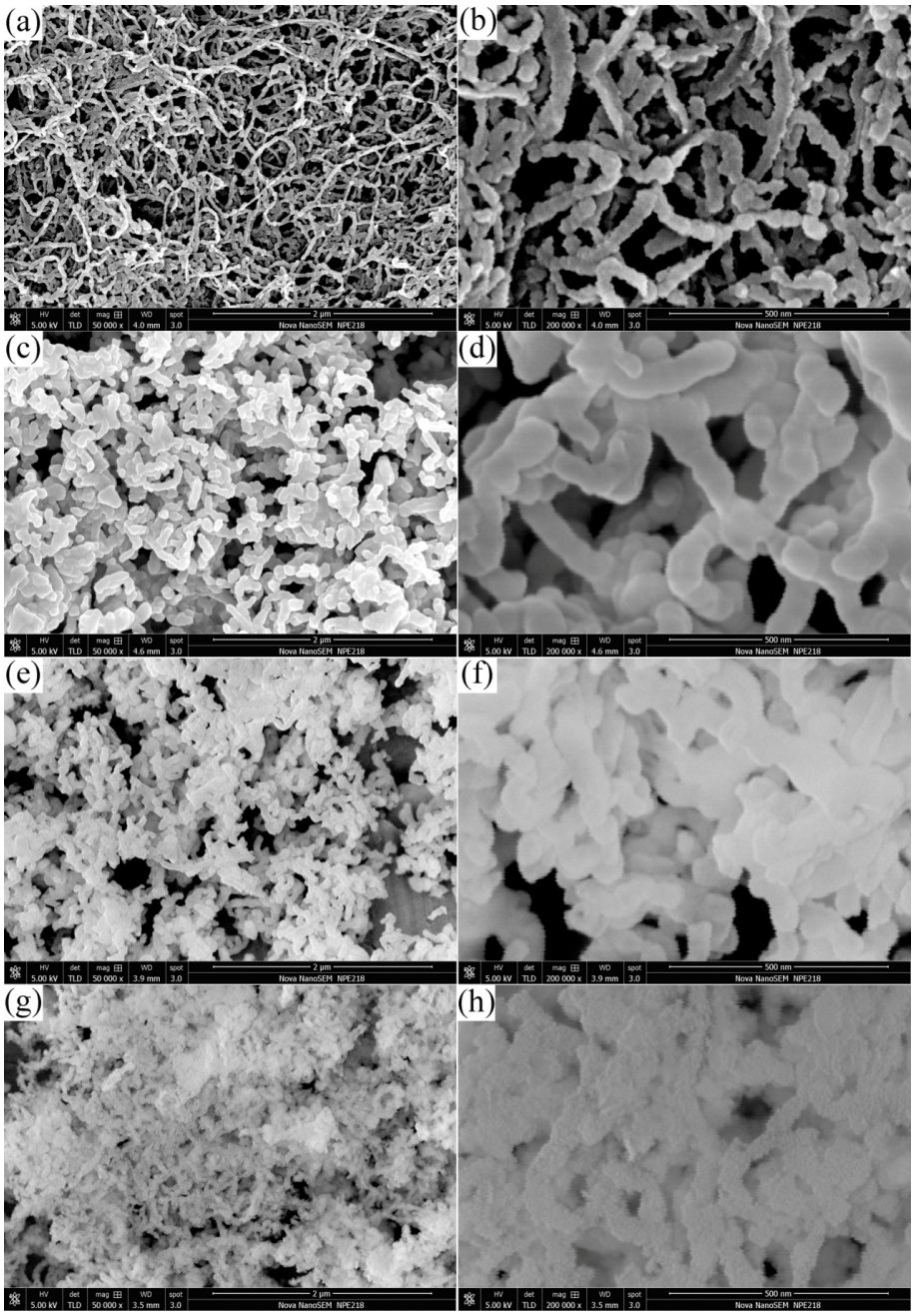

Fig. S1. SEM images of (a,b) ppy, (c,d) ppy@SiO_2, (e,f) SiO_2, and (g,h) SMNW.

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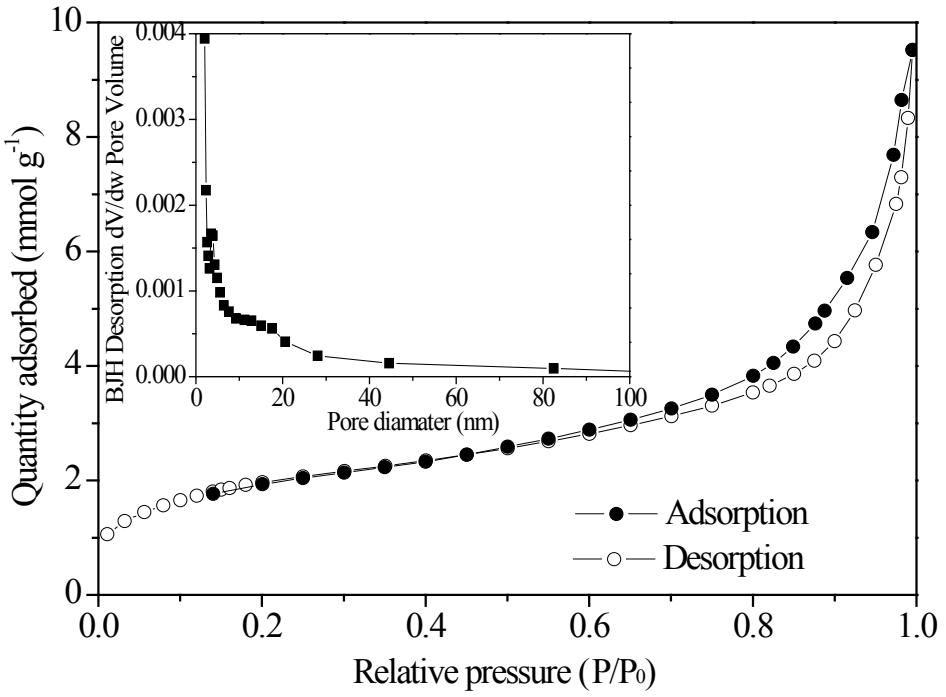

Fig. S2 N_2 adsorption/desorption isotherm and BJH pore-size distribution of SMNW.

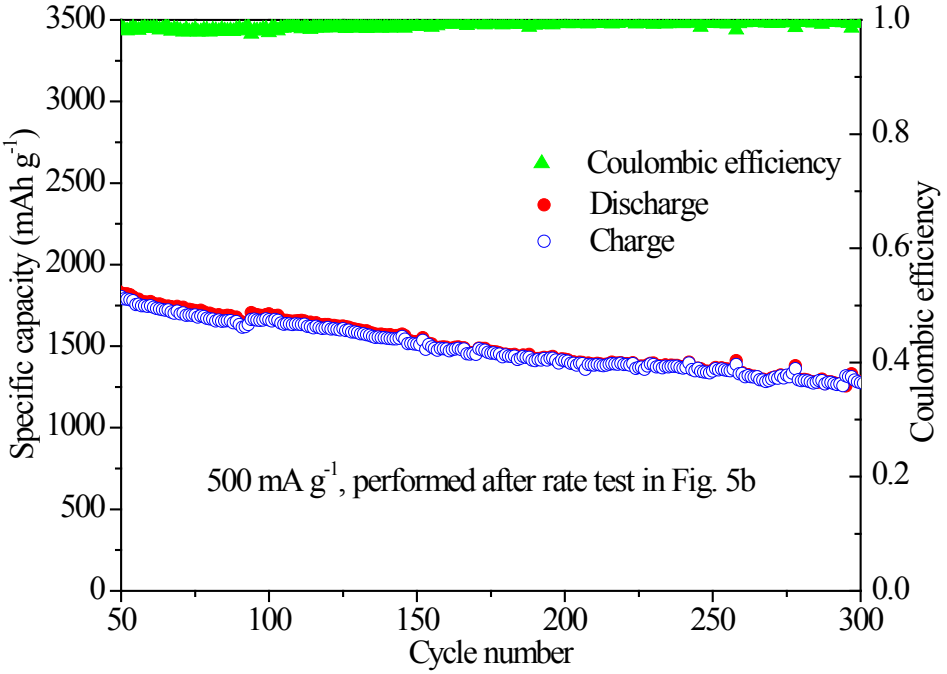

Fig. S3 Long-term cycling performance of SMNW at 500 mA g^{-1}, performed after rate test in Fig. 5b.

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Table S1 Comparison of our product with Si-based anode materials in other literature

Si-based anode materials	Potential cutoff (V)	Current density (mA g^{-1})	cycles	Capacity (mAh g^{-1})	Reference
Our product	1-0.01	500	50	1826	
Our product	1-0.01	500	100	1698	
Our product	1-0.01	500	300	1283	
Our product	1-0.01	2500	50	1234	
Our product	1-0.01	2500	300	858	
Si nanowires	1.5-0	300 (0.1 C)	50	1500	[1]
Si nanowires	3-0.01	179 (C/20)	20	800	[2]
Si nanowires	2-0.01	1/30C	60	1100	[3]
Si nanorods	2-0	0.15 C	100	1420	[4]
Si nanotubes	2-0.01	0.5 C	90	1050	[5]
Si-Cu nanorods	3-0.01	1000	3	750	[6]
Ni@Si nanowires	1.5-0	0.25 C	173	~1200	[7]
Nano-Si-graphene	1.2-0.01	200	30	1500	[8]
Si nanoparticles@CNT	1-0.01	1000	200	~870	[9]
Si@C nanospheres	1.5-0.01	200	20	340	[10]
Porous Si@C	2-0.01	100	50	~1500	[11]
Si@porous C microspheres	1.2-0.01	1000 (0.5 C)	50	1469	[12]
Mesoporous nano-Si	1.5-0	100	30	1600	[13]
Si/Fe film	1.2-0.02	150 uA (1 C)	300	204	[14]
C/Si/C microtubes	1.5-0.05	500	300	1000	[15]
Nano-Si@Co_3O_4	2.5-0	100	100	850	[16]
Nano-Si-CNT	2-0.01	500 (0.5 C)	50	~500	[17]
Nano-Si@$Ti_4Ni_4Si_7$	1.5-0.01	880 (1 C)	50	900	[18]
Si nanowires/TiN/Al	2-0.01	0.1 C	100	~1250	[19]
Si@C nanofibers	1.5-0.01	50	50	590	[20]
Si nanoparticles@C fibers	1.5-0.005	240 (0.2 C)	100	~1300	[21]

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