Supporting Information

for

Decoration of mesoporous carbon electrodes with tin oxide to boost their supercapacitive performance

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Table S1. Comparison of electrochemical performance of SnO_2-carbon composite electrodes for supercapacitors

Materials	**Highest capacitance**	**Cycling stability (Retention)**	**Electrolyte**	**Synthesis approach**	**References**
15-SNC/300	344 F g^{-1} at 5 mV s^{-1}	92.4%/5000 cycles/50 mVs^{-1}	1M K_2SO_4	Incipient wetness technique and redox reaction	This work
Mosaic-structured SnO_2@C porous microspheres	420 F g^{-1} at 1 A g^{-1}	91% /2000 cycles/1 A g^{-1}	1M Na_2SO_4	Ethanol-thermal carbonization and simple steam activation	1
Carbon-coated hollow SnO_2 microspheres	43.3 F g^{-1} at 10 mV s^{-1}	-	1M KOH	Template assisted method and calcination treatment	2
SnO_2 nanoclusters wrapped functionalized carbonized cotton cloth	197.7 F g^{-1} at 1 A g^{-1}	95.5%/5000 cycles/15 A g^{-1}	1M Na_2SO_4	Solvothermal reaction and calcination process	3
SnO_2 dots decorated porous carbon nanofibers	225.4 F g^{-1} at 1 A g^{-1}	~119.8%/ 2500 cycles	3 M KOH	Mild redox reaction	4
SnO_2/graphene nanocomposites	363.3 F g^{-1} at 10 mV s^{-1}	-	1M Na_2SO_4	Solvothermal method	5
SnO_2@CNT nanocomposites	188.42 F g^{-1} at 2 mV s^{-1}	~75% /1000 cycles/200 mV s^{-1}	2 M KCl	Screen-printing and sintering	6
SnO_2 nanosheets on carbon cloth	247 F g^{-1} at 1 A g^{-1}	76.9% /10000 cycles/3 A g^{-1}	0.5 M $LiNO_3$	Hydrothermal reactions and subsequent thermal treatments	7
Nitrogen doped graphene oxide@SnO_2	~378 F g^{-1} at 4 A g^{-1}	89%/5000 cycles/4 A g^{-1}	6 M KOH	Thermal reduction	8
Carbon coated-SnO_2 nanospheres	195 F g^{-1} at 1 A g^{-1}	90%/ 2000 cycles/2 A g^{-1}	4.5 M H_2SO_4	Sintering	9
SnO_2/MWCNT	133.33 F g^{-1} at 0.5 mA cm^{-2}	-	1M Na_2SO_4	Sonochemical synthesis	10
Nitrogen-doped reduced graphene oxide/SnO_2 composite	437 F g^{-1} at 5 mV s^{-1}	90% /1000 cycles/2 A g^{-1}	1M Na_2SO_4	One-step hydrothermal method	11
SnO_2/carbon aerogel composite	119.2 F g^{-1} at 1 mV s^{-1}	-	1 M H_2SO_4	Impregnation method	12
Gasified rice husk porous carbon/S-doped SnO_2 composite	215 F g^{-1} at 1.5 A g^{-1}	78.5%/5000 cycles/0.4 A g^{-1}	6 M KOH	Hydrothermal reaction	13
Hexagonal- shaped SnO_2@C nano	37.8 F g^{-1} at 5 mV s^{-1}	-	1 M H_2SO_4	Reaction under autogenic pressure at elevated temperature	14

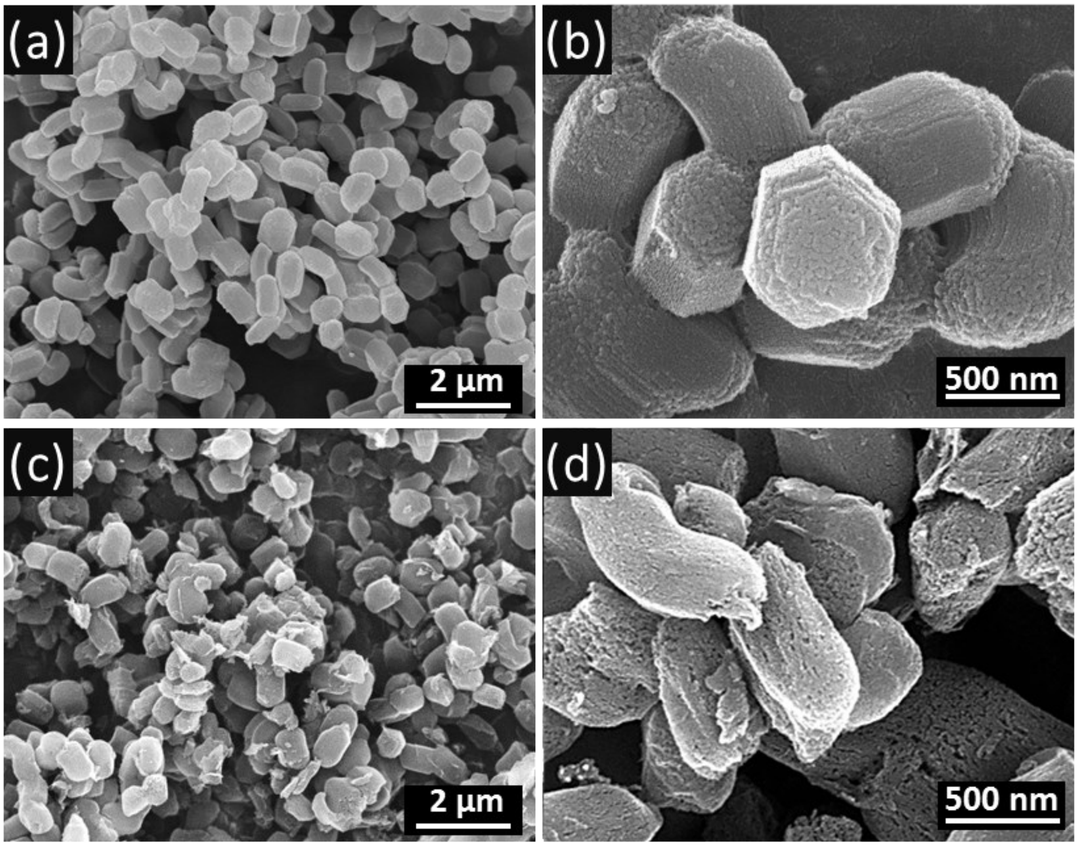

Fig. S1. SEM images of (a, b) SBA-15, and (c, d) N-CMK3.

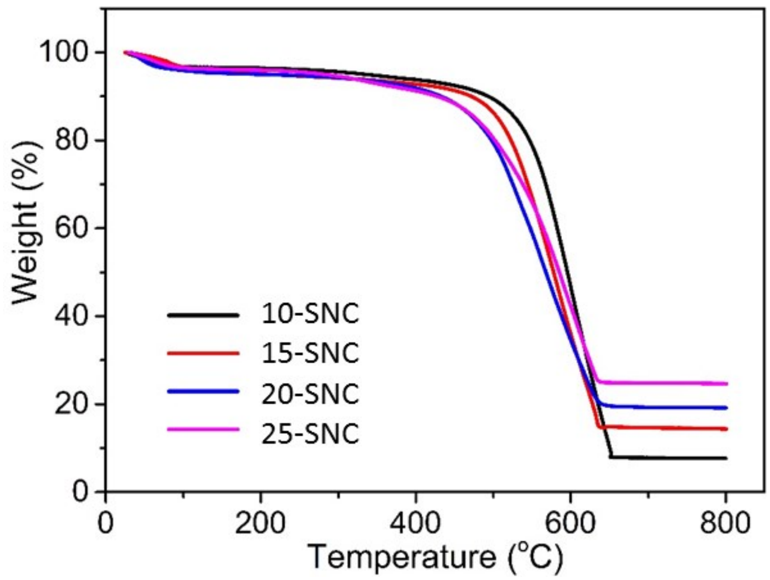

Fig. S2. TGA plots of SNC composites in air at a heating rate of 10 °C min^{-1}.

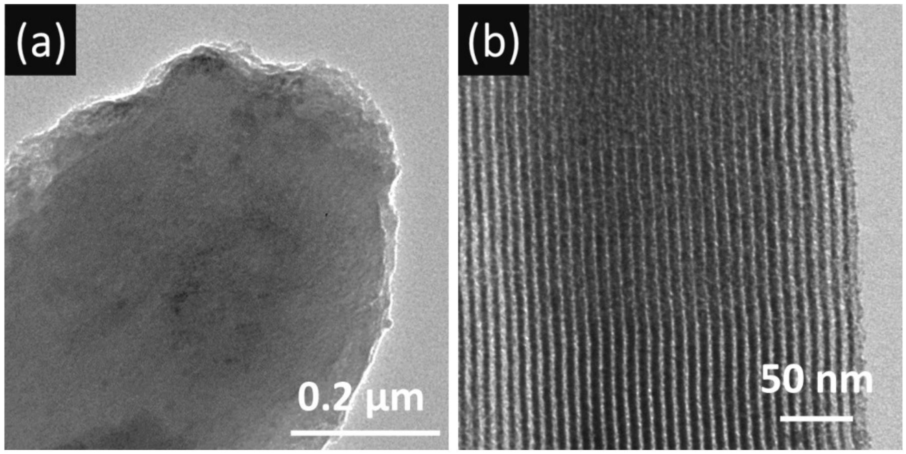

Fig. S3. (a) Low- and (b) high-resolution TEM images of N-CMK3.

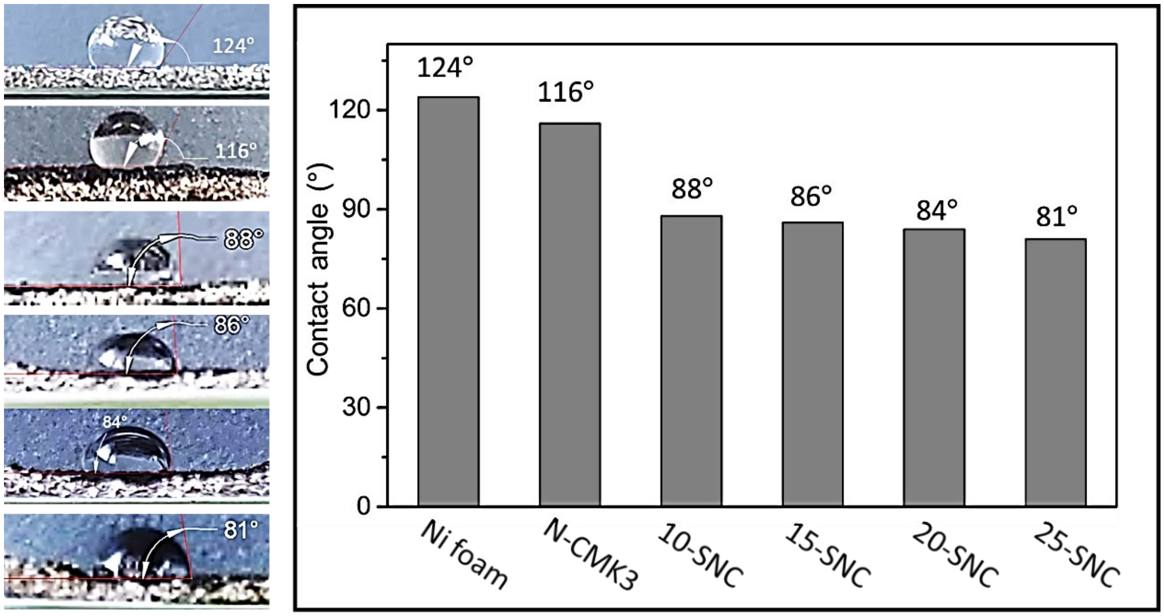

Fig. S4. Droplet contact angles for water droplets as a function of SnO_2 content loading of SNC composites.

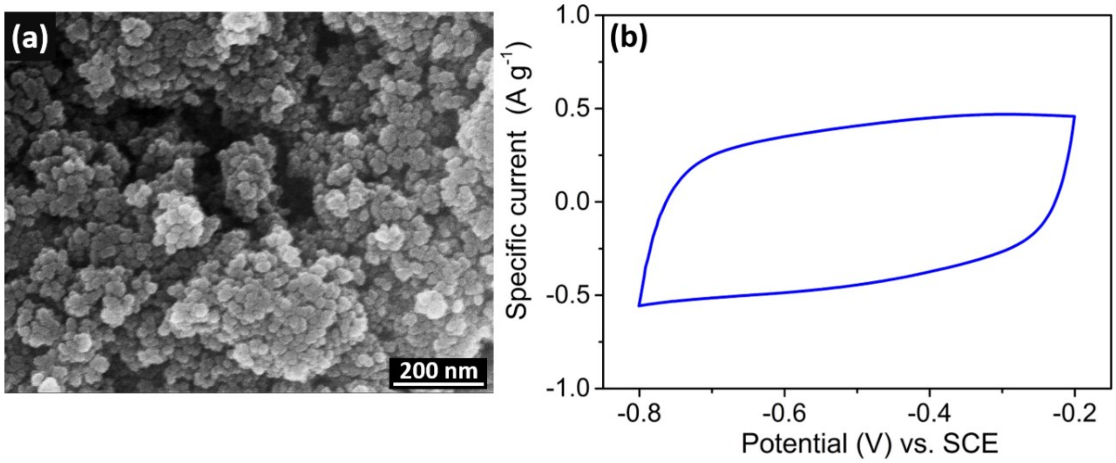

Fig. S5. (a) SEM image and (b) CV plot of the SnO_2 electrode in 1 M Na_2SO_4 at a scan rate of 5 mV s^{-1}.

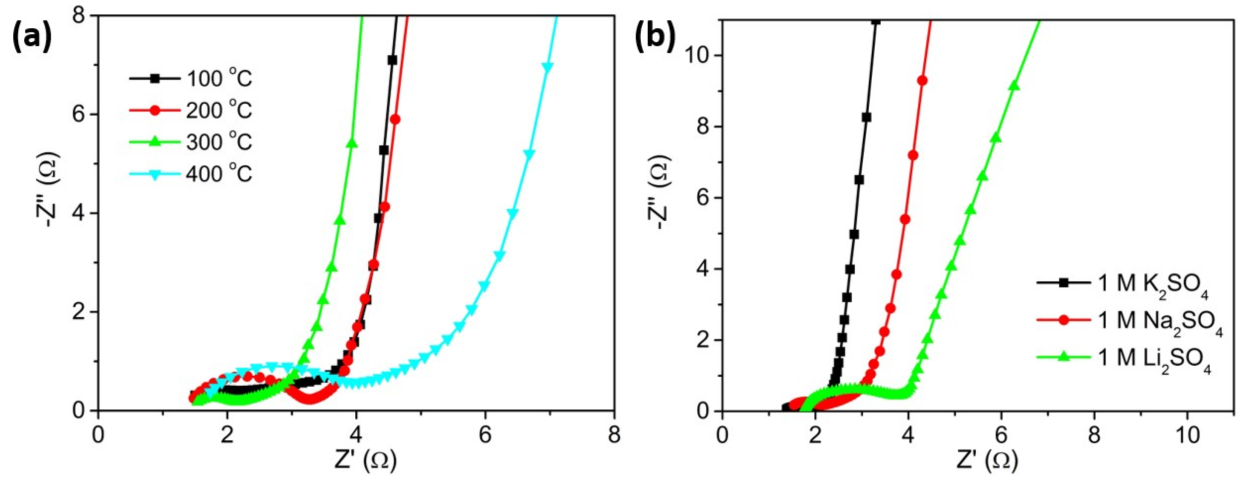

Fig. S6. Impedance spectra of the (a) 15-SNC composite after exposure to heat at temperatures ranging from 100 °C to 400 °C and (b) 15-SNC/300 in aqueous electrolytes of sulfate salts.

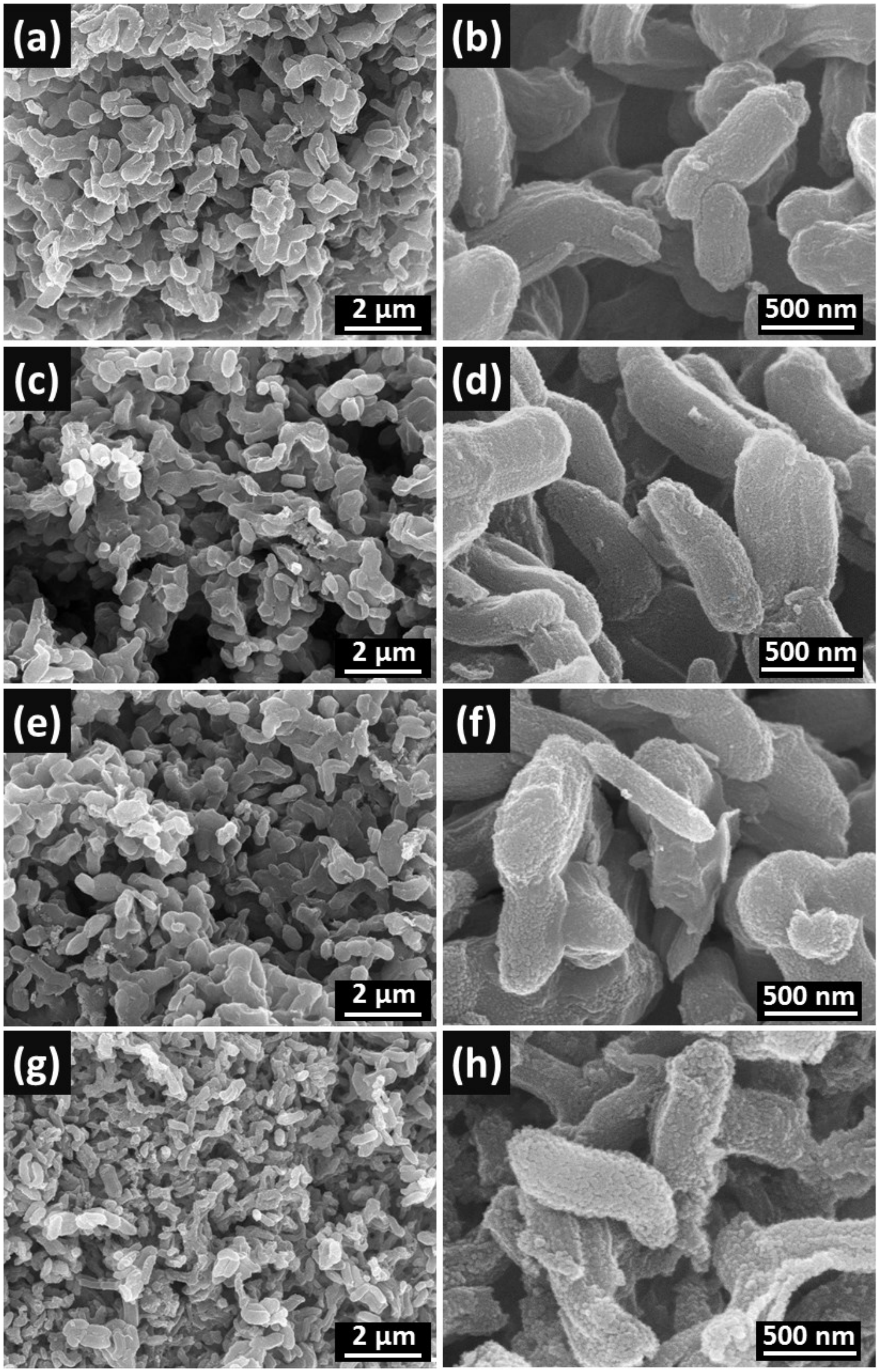

Fig. S7. Low- and high-resolution SEM images of 15-SNC annealed at different temperatures: (a, b) 100 °C, (c, d) 200 °C, (e, f) 300 °C, (g, h) 400 °C.

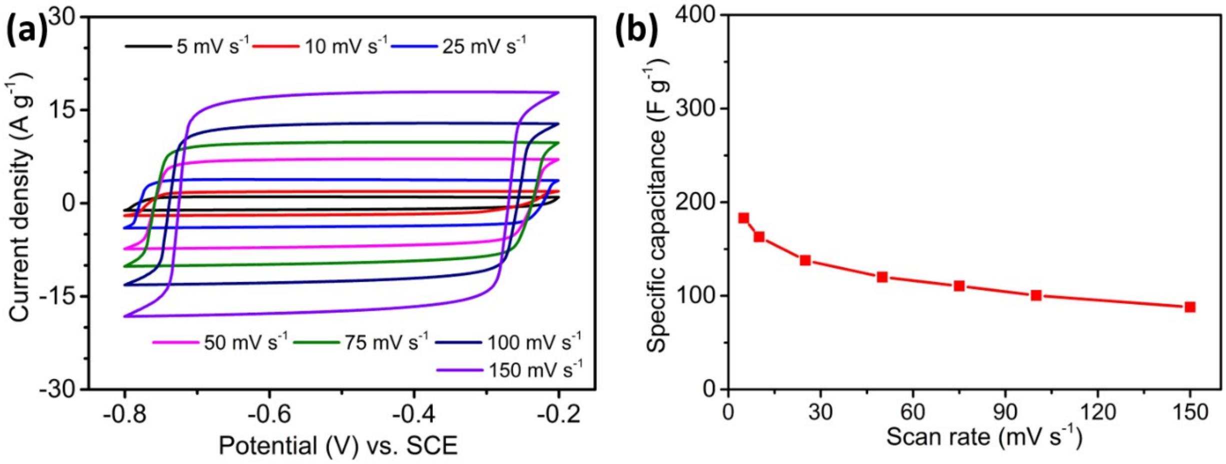

Fig. S8. Cyclic performance of the N-CMK3 electrode in 1 M K_2SO_4 electrolyte: (a) CV plot at different scan rates, (b) dependence of the specific capacitance on the scan rate.

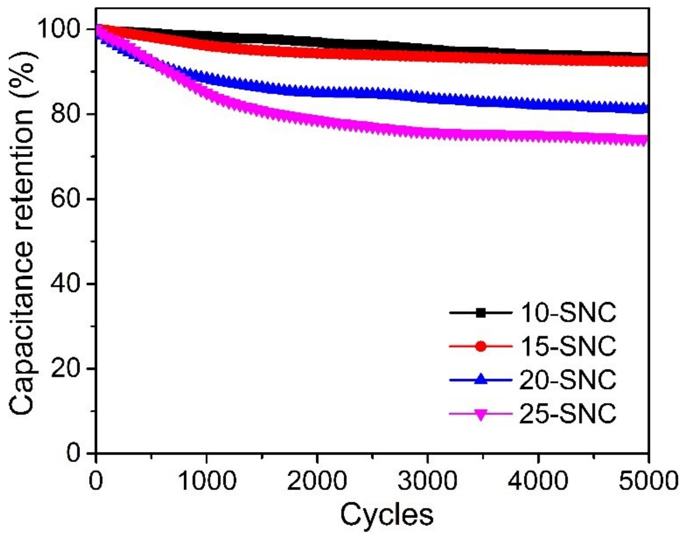

Fig. S9. Capacitance retention of different SNC composite electrodes in 1 M K_2SO_4 electrolyte for 5000 cycles at a scan rate of 50 mV s^{-1}.

References

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