Electronic Supplementary Information

Synthesis and Characterization of Carbon Coated Sponge-like Tin Oxide (SnO_x) Films and Their Application as Electrode Materials in Lithium Ion Batteries

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Keywords: Tin dioxide • Anodization • Batteries • Coating

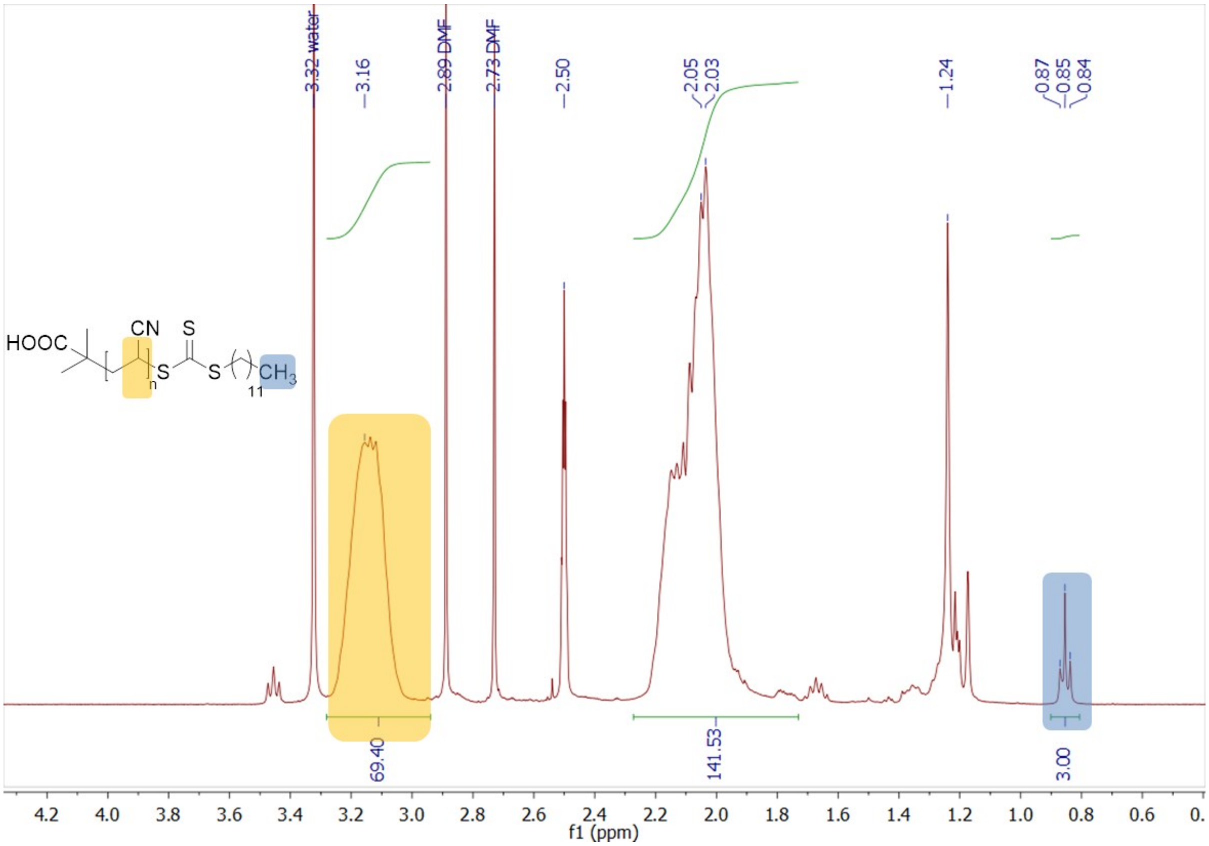

Figure S1. ^{1}H-NMR spectrum of polyacrylonitrile. The number average of the molecular weight is determined to be 70, as confirmed by the ratio of the integrals of the signals at 0.85 ppm (CH_3-group of the chain transfer agent end-group) and the signal at 3.16 ppm (CH-backbone signal of the polyacrylonitrile).

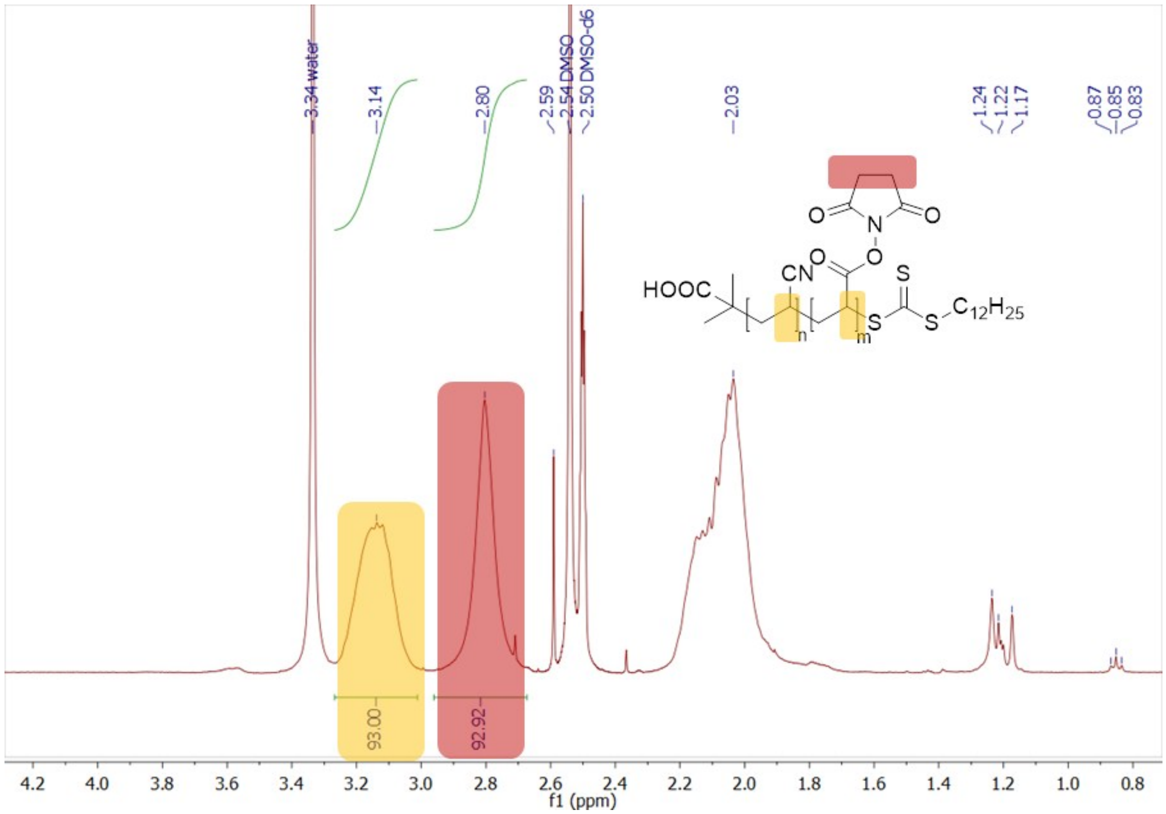

Figure S2. [1]H-NMR spectrum of poly(acrylonitrile-block-N-acryloxysuccinimide).

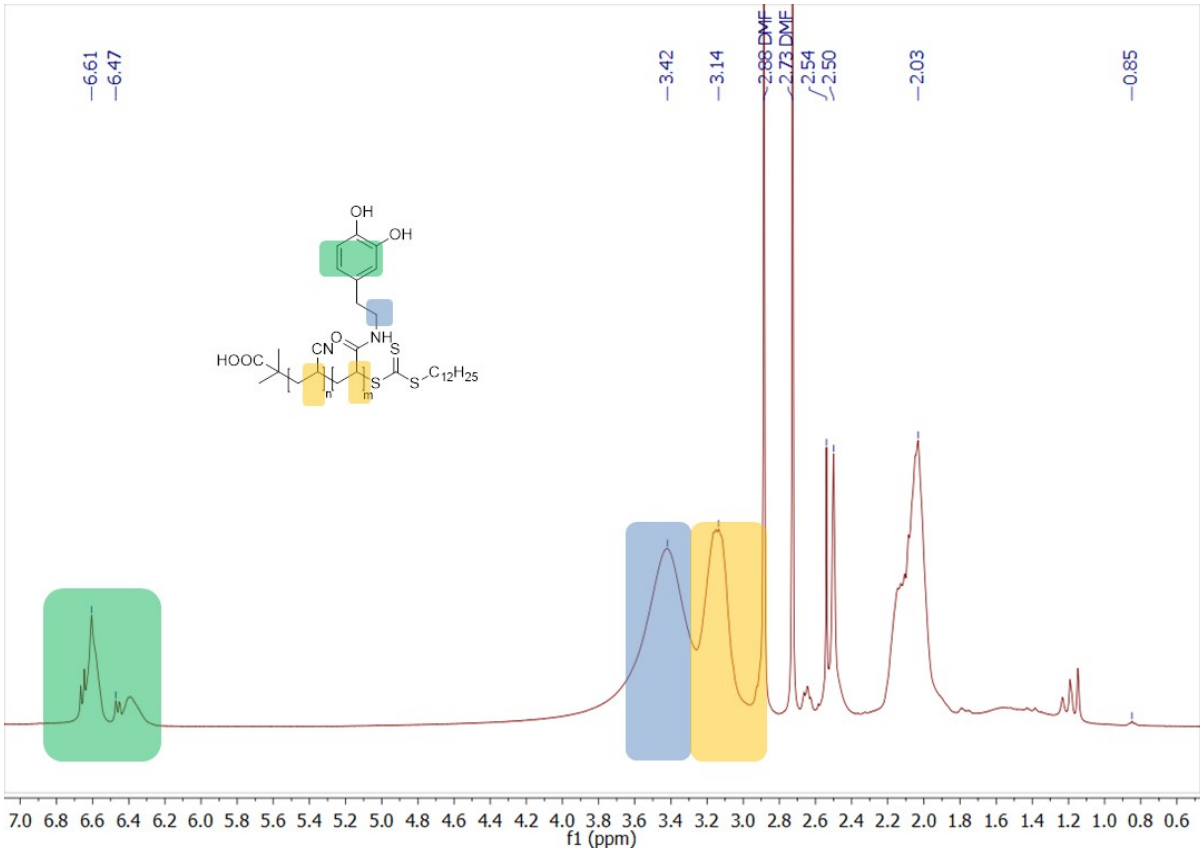

Figure S3. ^{1}H-NMR spectrum of poly(acrylonitrile-block-dopamine acrylamide) showing both the typical polyacrylonitrile signals and the dopamine acrylamide signals.

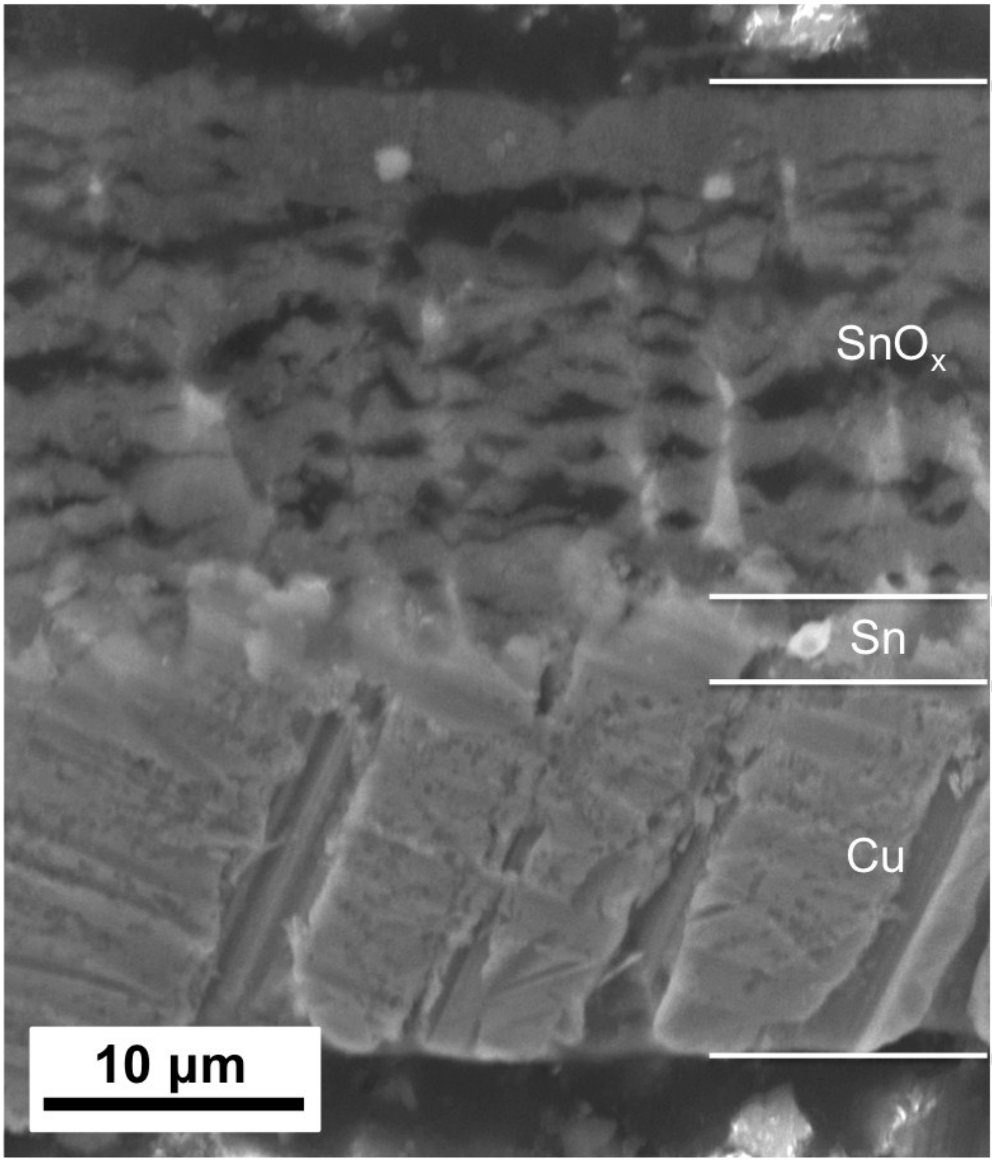

Figure S4. Cross section SEM image of coated sample. Top: Sponge-like nanoporous SnO_x (grey), cracks from oxygen evolution breaking up regular tubular structure (black). Middle: Tin gluing layer connecting nanoporous tin oxide to underlying copper foil. Bottom: Copper foil.

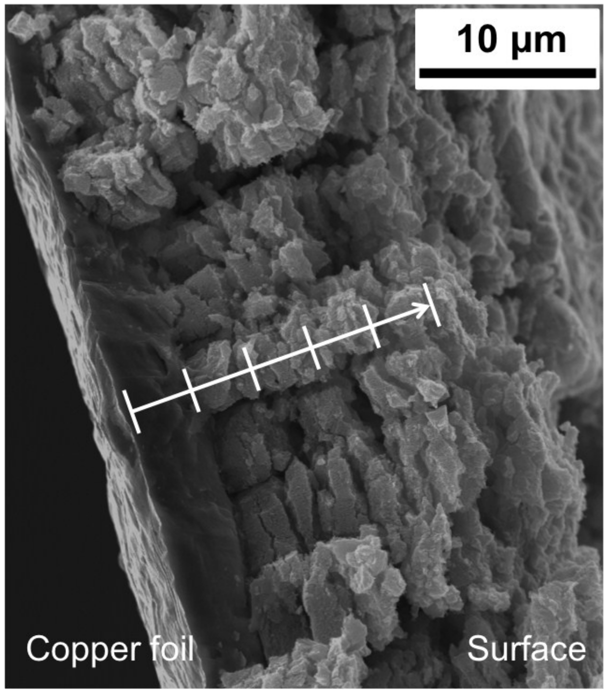

Figure S5. Cross section SEM image of carbon coated SnO_x sponge. The arrow shows the direction of measurement with lines indicating measuring points for EDX

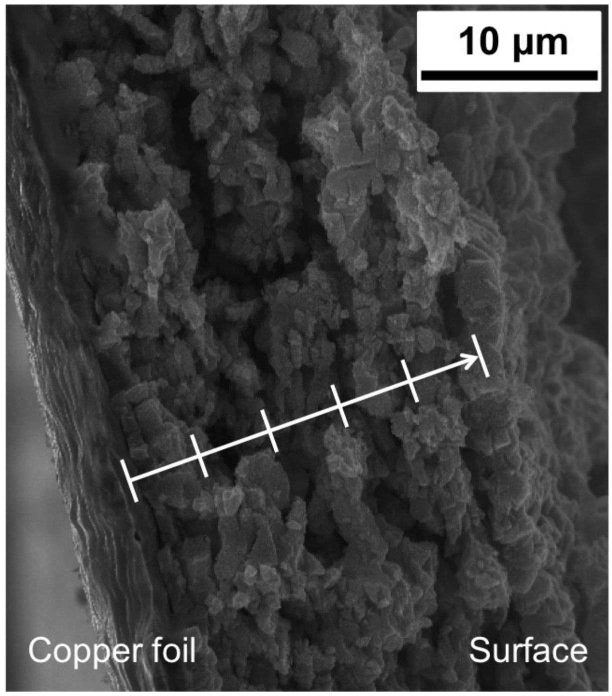

Figure S6. Cross section SEM image of carbon coated SnO_x sponge. The arrow shows the direction of measurement with lines indicating measuring points for EDX.

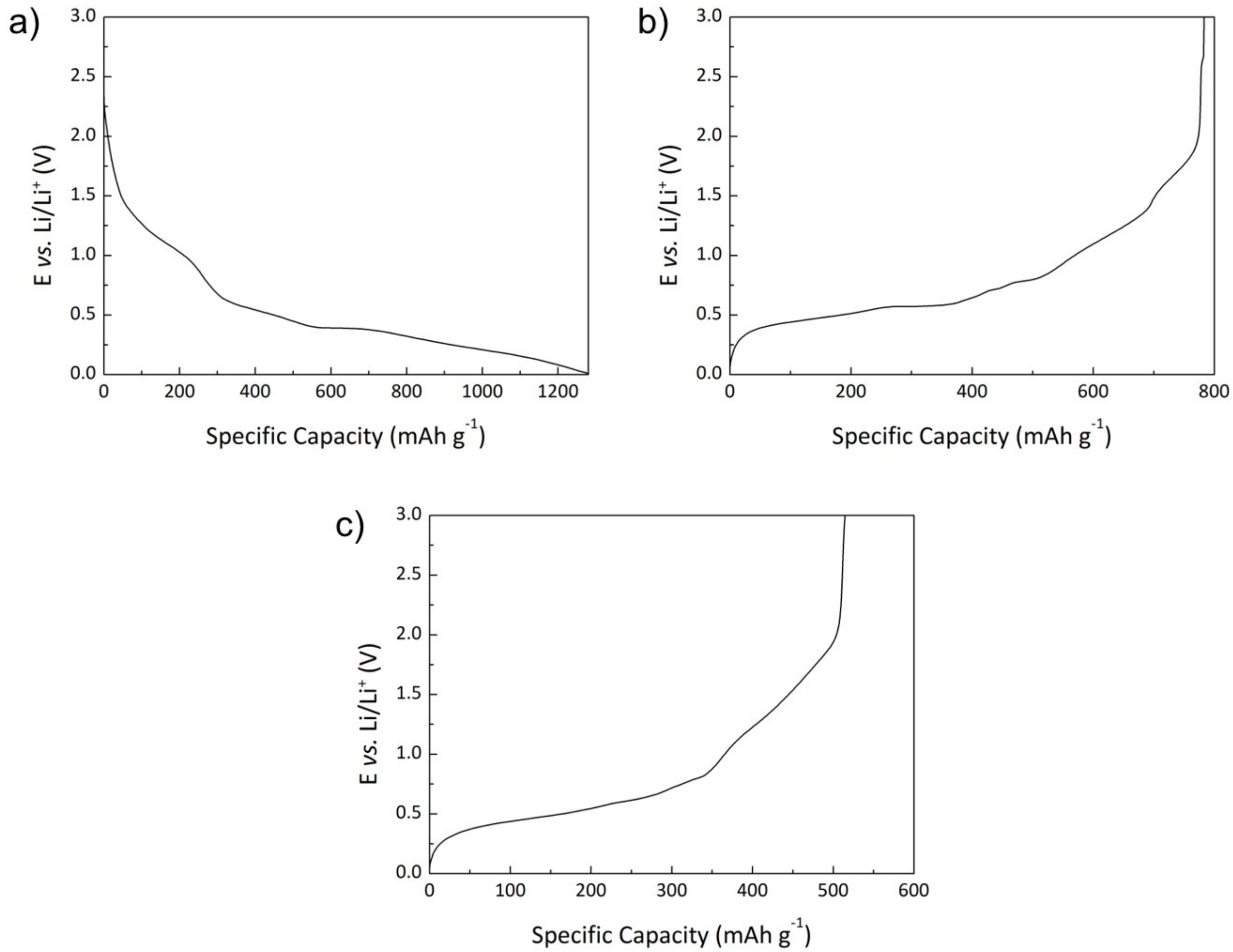

Figure S7. Potential profile of the first discharge (a), first charge (b) and fifth charge (c) of the corresponding XRD measurements shown in Figure 12. Cut-off potential: 0.01 V and 3.0 V.

Table S1 Atomic Concentrations for measured elements of anodized sample

	C	O	Cu	Sn
1	5.07	0	92.7187	2.2129
2	0	8.5573	55.002	36.4406
3	0	38.9735	4.415	56.6115
4	0	38.0204	2.751	59.2285
5	0	41.0113	1.6139	57.3748
6	0	40.2376	2.9094	54.2173

Table S2. Atomic Concentrations for measured elements of carbon coated sample

	C	O	Cu	Sn
1	0.00	0.73	95.31	3.95
2	3.42	27.73	8.86	59.99
3	3.05	29.56	3.44	63.95
4	2.09	31.45	2.87	63.59
5	0.98	14.90	2.81	81.31
6	1.52	8.68	1.52	87.49

Table S3. Summary of discharge capacity of various SnOx-based materials.

System	discharge capacity / mAh g^{-1}	Current density / mA g^{-1}	Number of cycles	Relative content of active material within the electrode	Reference
C-coated anodized sponges	400	50	50	95-97 wt.%	Present study
anodized SnO_x sponges	300	130	20	78 wt.%	1
SnO_2 hollow nanostructures	500	160	40	80 wt.%	2
SnO_2 nanoboxes	570	160	40	70 wt.%	3
SnO_2 nanowires	300	100	50	75 wt.%	4
SnO_2 polypyrrole nanocomposites	400	50	20	80 wt.%	5
Tin oxide nanoflowers	500	88	20	75 wt.%	6

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