Supporting Information

Sol–gel synthesis of dictyophora-shaped hierarchically porous Mn_2SnO_4/C materials as anode for Li-ion batteries

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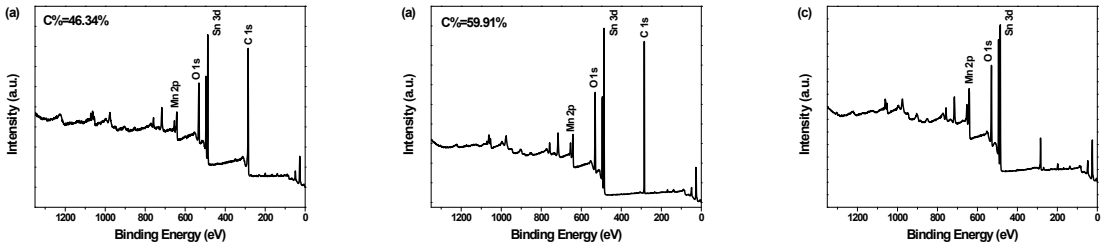

Figure S1. Wide-scan XPS spectra: (a) DS-cMSO/C, (b) BS-cMSO/C and (c) cMO/SO.

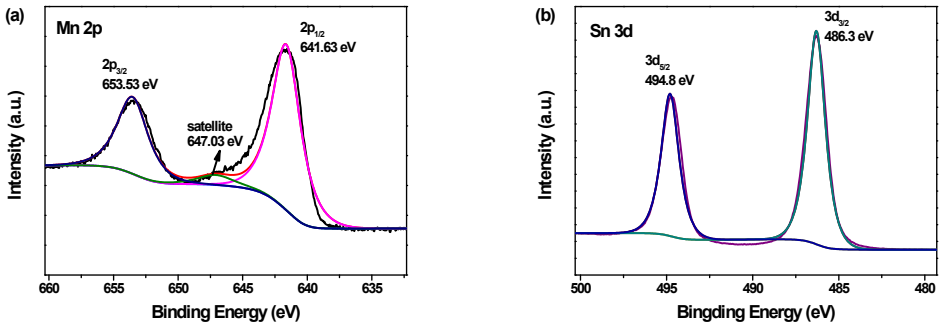

Figure S2. XPS spectra of BS-cMSO/C: (a) Mn 2p, (b) Sn 3d.

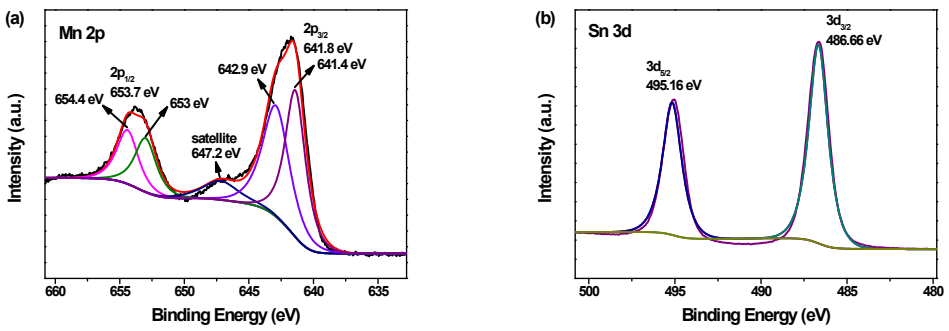

Figure S3. XPS spectra of cMO/SO: (a) Mn 2p, (b) Sn 3d.

In order to investigate the reaction during the calcination, the TG-DSC measurement of the Mn-Sn hydroxide xerogel under air atmosphere was carried out, as shown in Figure S4. As the sample was prepared with the polymer, the strong exothermic peak appears between 300 and 400 ℃ in the DSC curve and the steep reduction of the sample weight is observed around 350 ℃ in the TG curve, which are attributed to the pyrolysis of the polymers. The weight loss is also observed below 250 ℃, which is derived from the removal of Cl-containing species from the sample. The obtained gel networks include a lot of Cl^- ions derived from $MnCl_2$ and $SnCl_2$. These species presumably coordinate to Mn(Ⅱ) and Sn(Ⅱ) or play a role of the charge compensation in the networks. The exothermic peak can be observed around 357 ℃ in the sample. Taking into account that the crystallization of the sample with the polymers took place between 300 and 550 ℃, as shown in Figure 2, the exothermic peak around 357 ℃ can be attributed to the crystallization of Mn_2SnO_4.

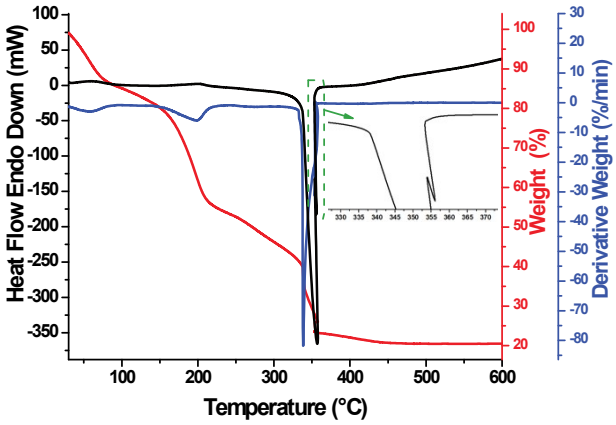

Figure S4. TG-DSC curves of the Mn-Sn hydroxide.

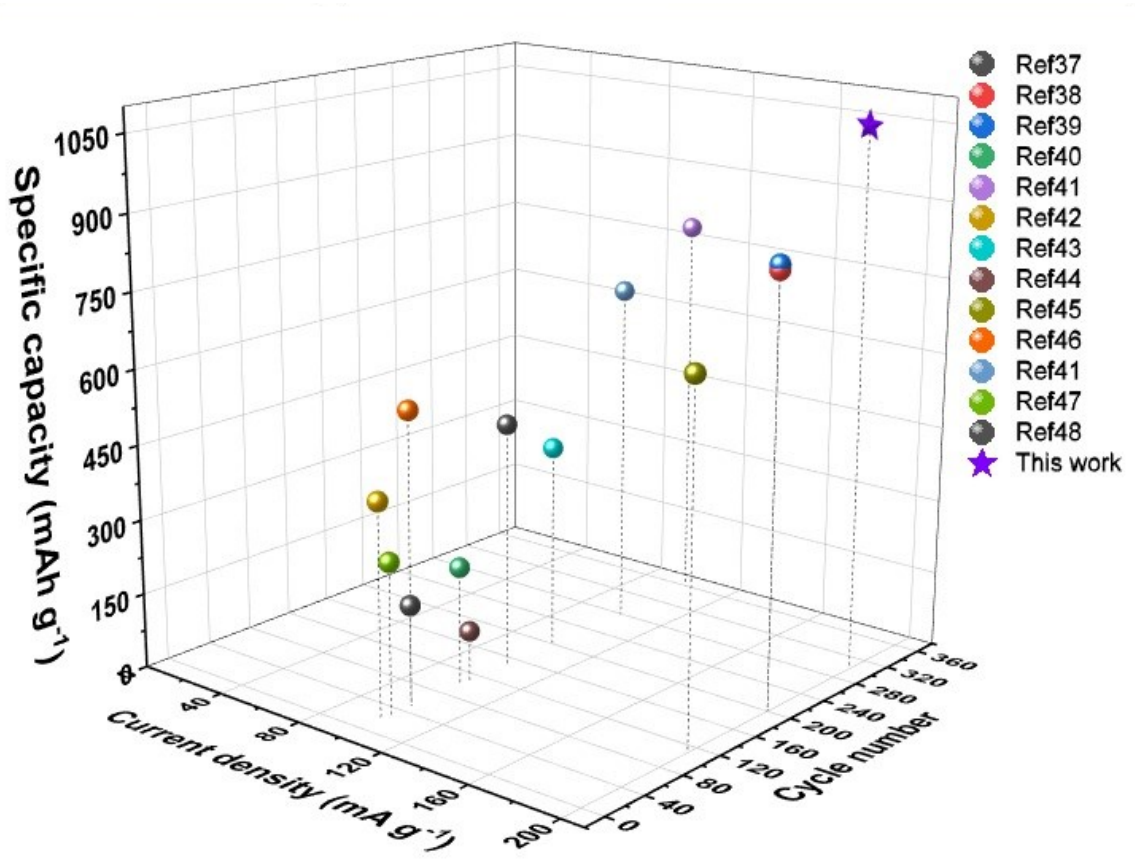

Figure S5. Electrochemical performances of Mn_2SnO_4 materials as LIB anode reported in the open literature.

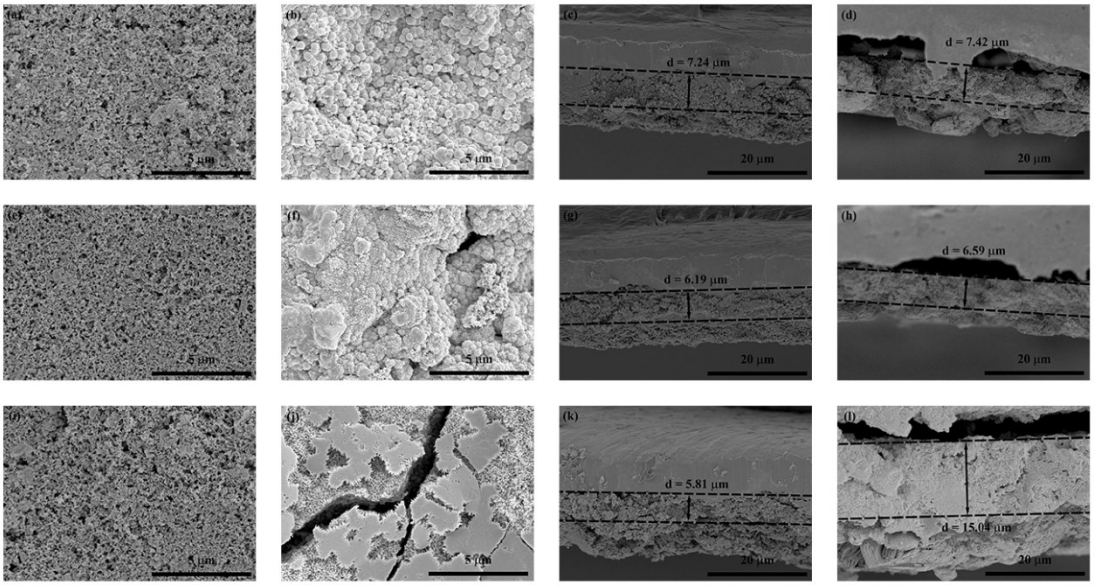

Figure S6. The SEM images of the (a and b) DS-cMSO/C, (e and f) BS-cMSO/C and (i and j) cMO/SO electrode surface before and after 50 cycles; The cross-sectional SEM images of the (c and d) DS-cMSO/C, (g and h) BS-cMSO/C and (k and l) cMO/SO electrode surface before and after 50 cycles.

Table S1. The R_s, R_{ct} and lithium ion diffusion coefficients $D_{(Li+)}$ of DS-cMSO/C, BS-cMSO/C and cMO/SO.

Electrodes	Rs（Ω）	Rct（Ω）	Slope（$Z' \sim \omega^{-1/2}$）	$D_{(Li+)}$ (cm^2/S)
DS-cMSO/C	4.47	74.66	297.63	1.47×10^{-18}
BS-cMSO/C	3.93	218.50	300.28	1.45×10^{-18}
cMO/SO	5.94	288.90	383.05	5.94×10^{-19}