MoS_2 nanoflowers encapsulated in carbon nanofibers containing amorphous SnO_2 as an anode for lithium-ion batteries

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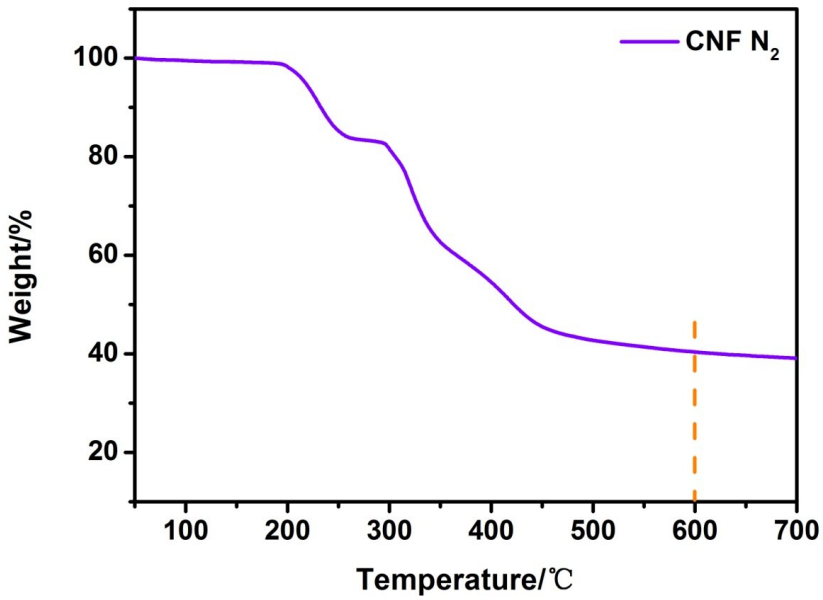

Fig. S1. TG curve of CNF precursor films under N_2 atmosphere.

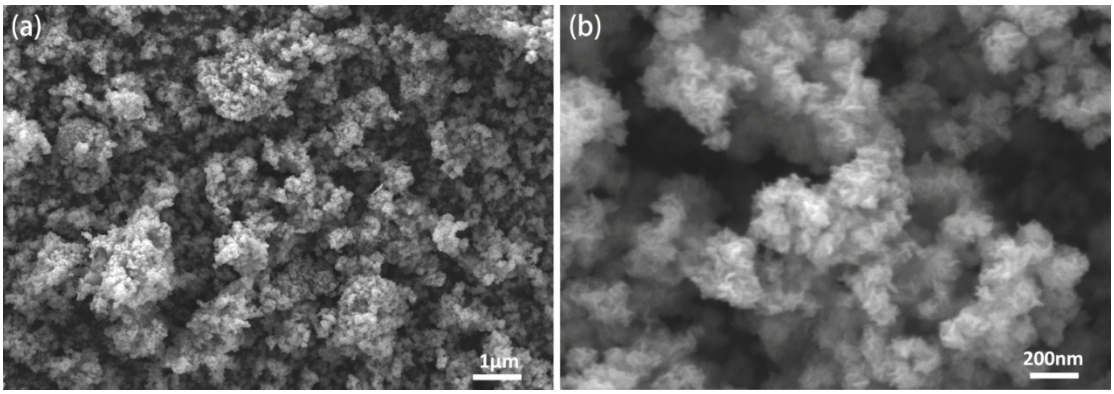

Fig.S2. (a-b) The SEM images of MoS_2 nanoflowers at different magnification.

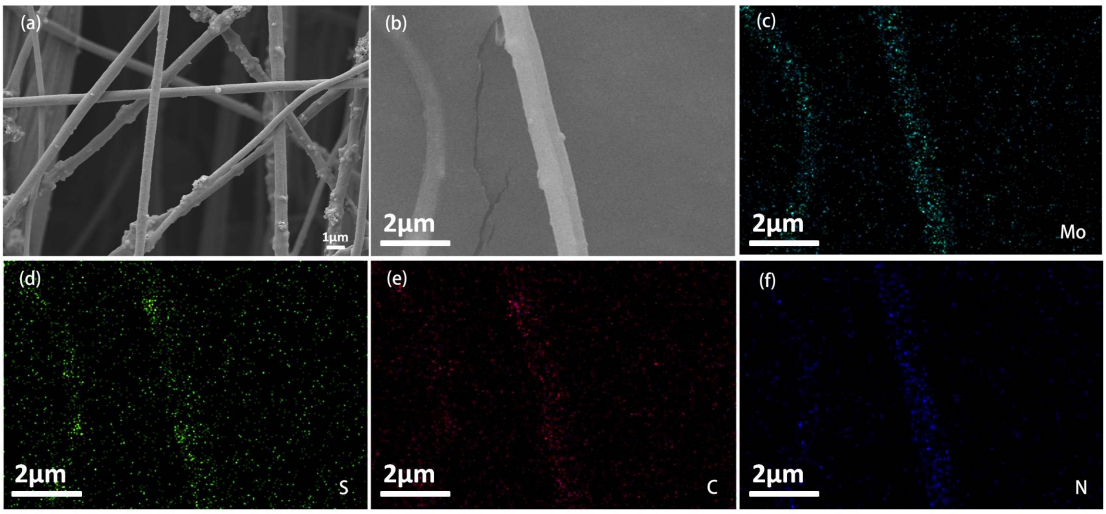

Fig.S3. (a-b) The SEM images of MoS_2@CNF composites at different magnifications; mapping of Mo (c), S (d) , C (e) and N(f) elements.

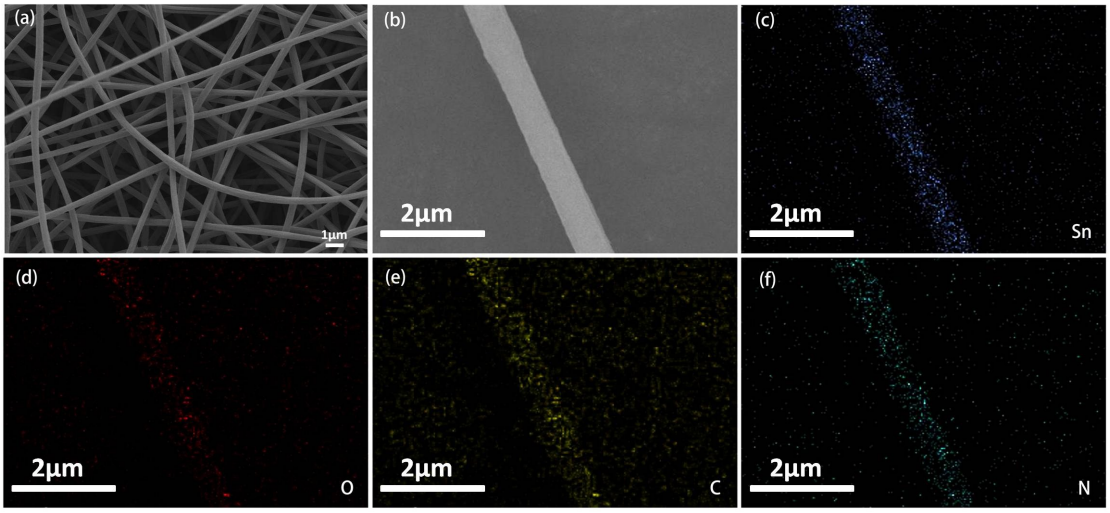

Fig.S4. (a-b) The SEM images of SnO_2@CNF composites at different magnifications; mapping of Sn (c), O (d) , C (e) and N(f) elements.

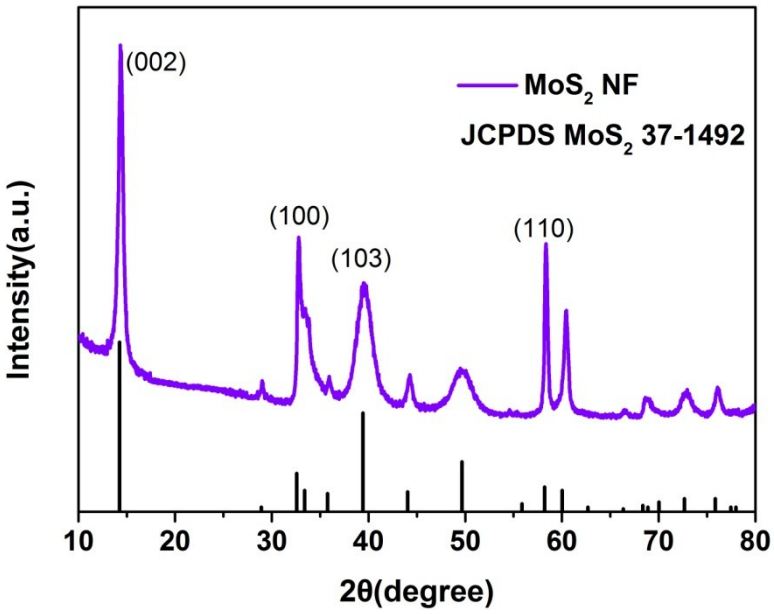

Fig.S5. XRD patterns of the MoS_2 nanoflowers.

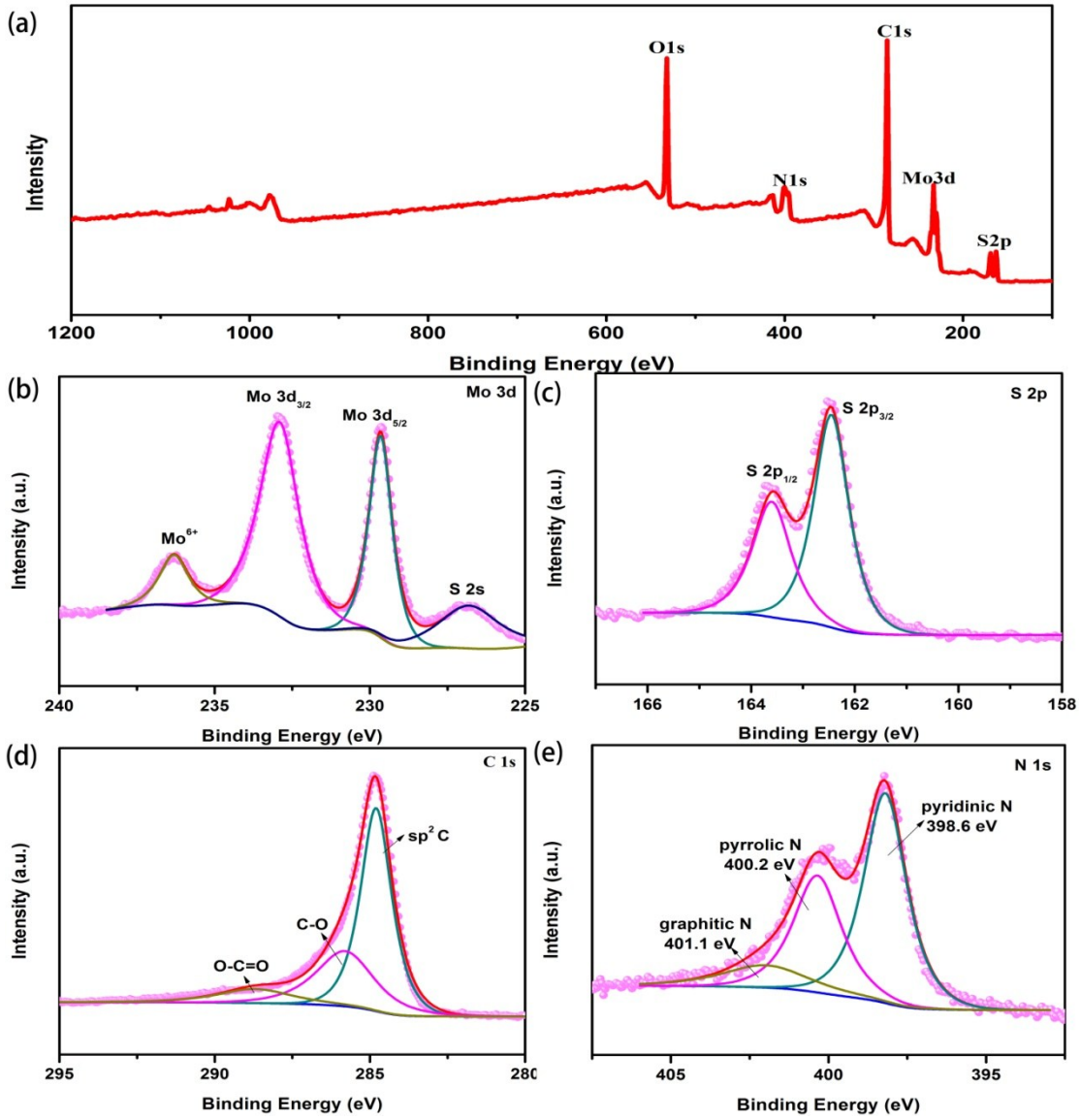

Fig. S6. (a) XPS survey scan spectrum and core level spectra of (b) Mo 3d, (c) S 2p, (d) C 1s and (e) N 1s for MoS_2@CNF.

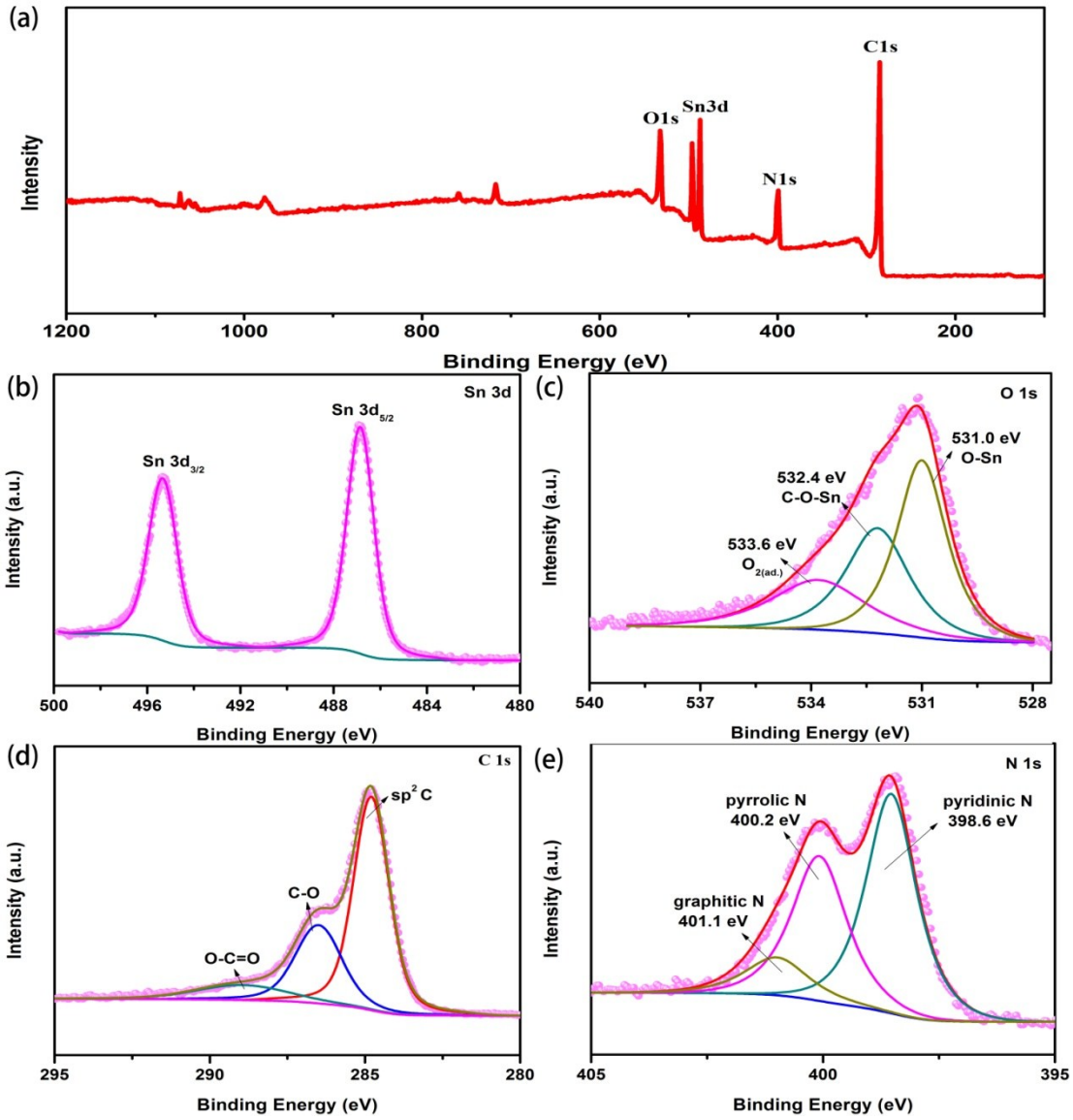

Fig. S7. (a) XPS survey scan spectrum and core level spectra of (b) Sn 3d, (c) O 1s, (d) C 1s and (e) N 1s for MoS_2-SnO_2@CNF.

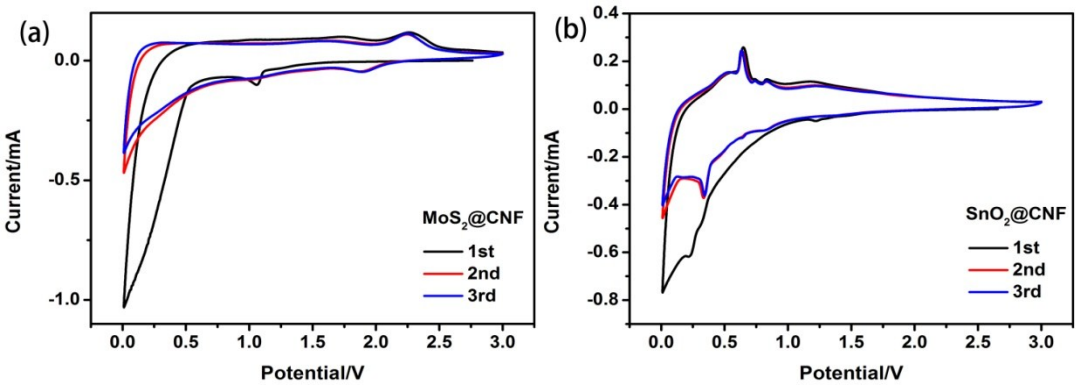

Fig.S8. The first three consecutive CV curves of MoS_2 @CNF (a) and SnO_2@CNF (b).

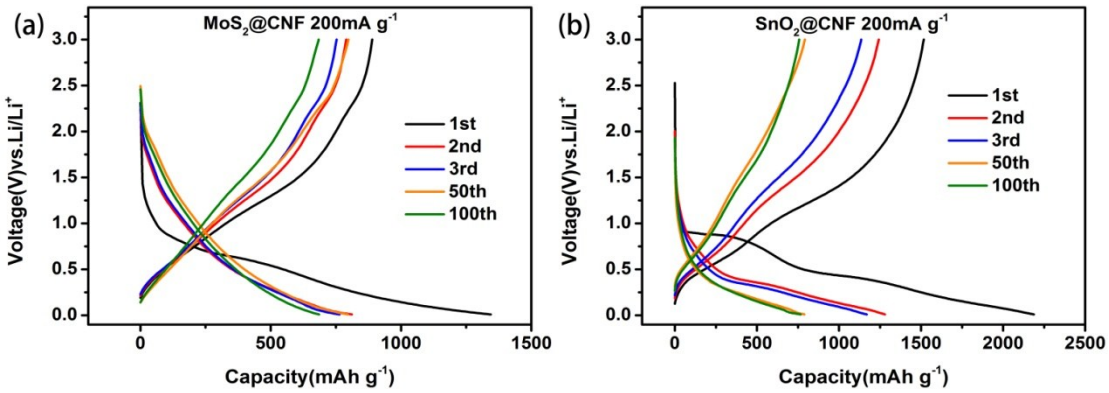

Fig. S9. Discharge–charge curves of the MoS_2@CNF (a) and SnO_2@CNF (b) electrode at current density of 200 mA g^{-1}.

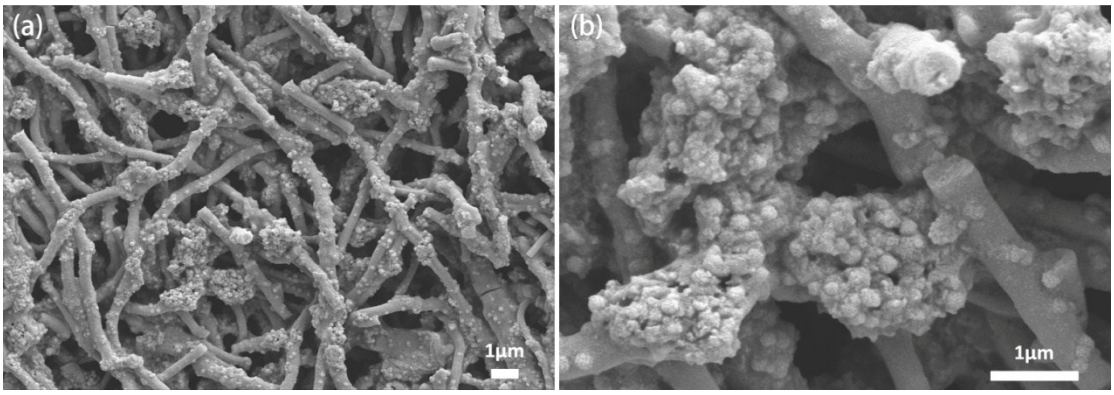

Fig. S10. SEM image of SnO_2@CNF electrode after the 430th cycle at 2000 mA g^{-1}.

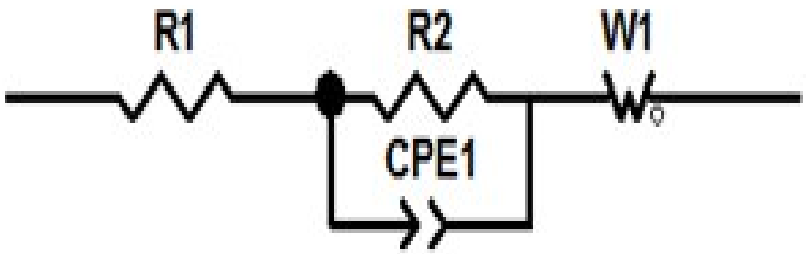

Fig. S11. The equivalent circuit of the sample.

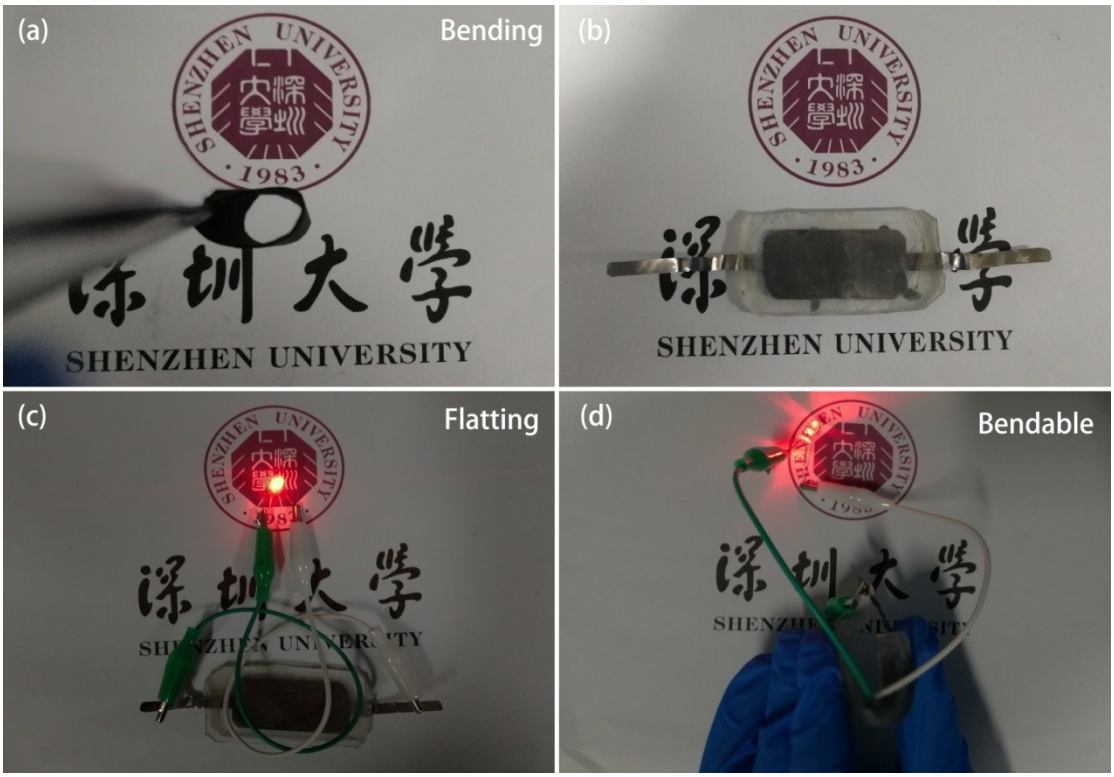

Fig.S12. (a) The MoS_2-SnO_2@CNF under bending states; (b) photograph of a flexible battery and a LED lightened by the flexible battery under (c) flatting and (d) bending (180°) states.

Table. S1. Comparison of the electrochemical lithium storage performance of the MoS_2-SnO_2@CNF electrodes with the literature data.

Materials	Reversible capacity ($mAhg^{-1}$)/Cycle number				Ref.
	Current density 100mA g^{-1}	**Current density 200mA g^{-1}**	**Current density 500mA g^{-1}**	**Current density 2000mA g^{-1}**	
SnO_2@C@VO_2	765/100th		424/600th		[1]
SnO_{2-x}:RGO		950/100th		700/100th	[2]
MoC–N–C				675/500th	[3]
SnS/C		648/500th	548/500th		[4]
SnS/MoS_2–C		989/60th		718/700th	[5]
NDG/MoS_2/NDG	750/100th				[6]
MoS_2/NC		904/100th		534/400th	[7]
MoS_2@EPF			854/200th	531/200th	[8]
SnO_2/GA	700/80th	512/10th			[9]
Sn@SnO_x@MoS_2@C			791/100th	530/800th	[10]
MoS_2-SnO_2@CNF		**983/100th**		**710/800th**	**This work**

Table. S2. R_{ct}, σ and D_{Li+} values determined from the EIS for all the electrodes

	R_{ct}（Ω）	σ（Ω cm^2 $s^{-0.5}$）	D_{Li+}（cm^2 s^{-1}）
MoS_2-SnO_2@CNF-1	182.6	56.8	4.9×10^{-15}
MoS_2-SnO_2@CNF-2	147.6	43.8	8.2×10^{-15}
MoS_2-SnO_2@CNF-3	197.2	69.6	3.3×10^{-15}
MoS_2@CNF	266.1	82.3	2.3×10^{-15}
SnO_2@CNF	254.8	79.4	2.5×10^{-15}

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