Electronic Supplementary Information (ESI)

Hierarchical nanotubes constructed from interlayer-expanded $MoSe_2$ nanosheets as highly durable electrodes for sodium storage

Junjun Zhang,[a,c] Meihui Wu,[a] Tong Liu,[a] Wenpei Kang*[b] and Jun Xu*[a]

[a]School of Electronic Science & Applied Physics, Hefei University of Technology, Hefei 230009, P. R. China

[b]State Key Laboratory of Heavy Oil Processing and College of Science, China University of Petroleum (East China), Qingdao 266580, P. R. China

[c]Department of Materials Science & Engineering, Southern University of Science and Technology, Shenzhen 518055, P. R. China

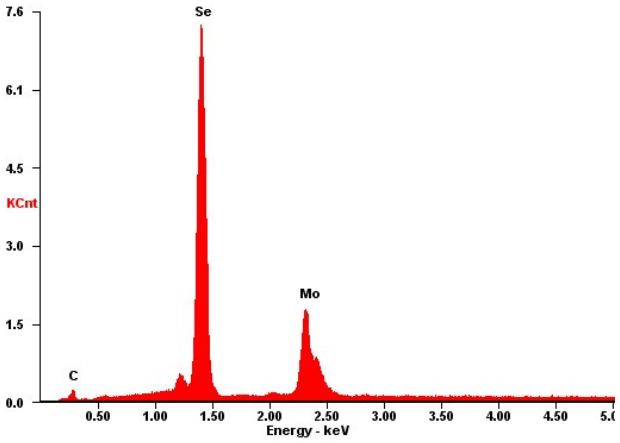

Fig. S1 EDX spectrum of the $MoSe_2$ nanotubes.

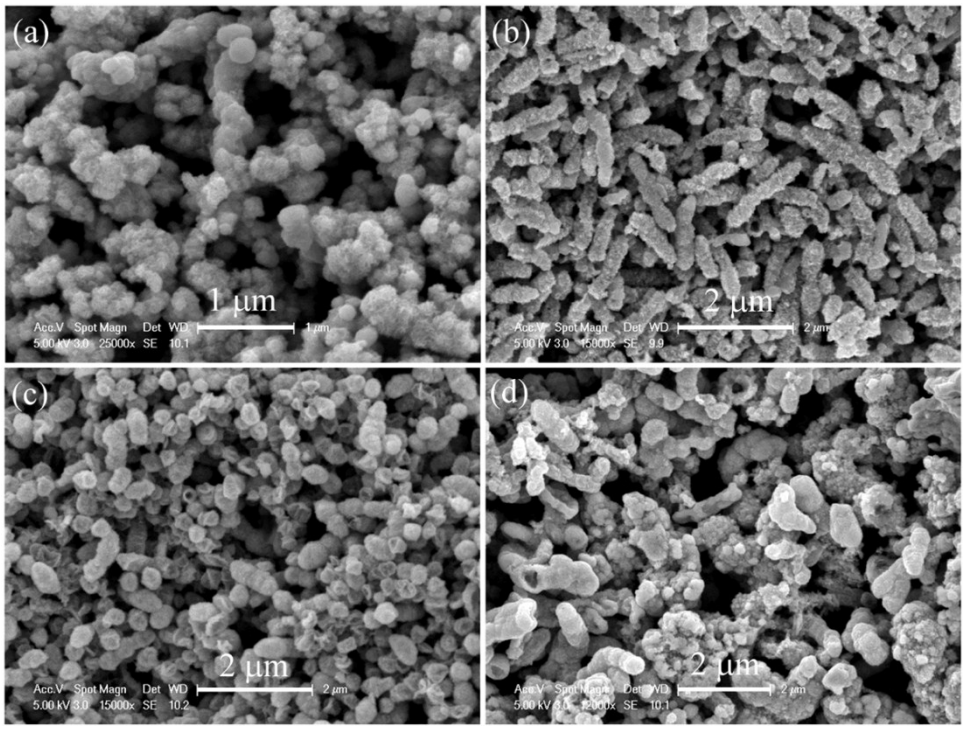

Fig. S2 (a-d) SEM images of the $MoSe_2$ samples obtained with different volume ratios of ethanol/octylamine: (a) 5 mL/20 mL, (b) 10 mL/15 mL, (c) 15 mL/10 mL, and (d) 20 mL/5 mL.

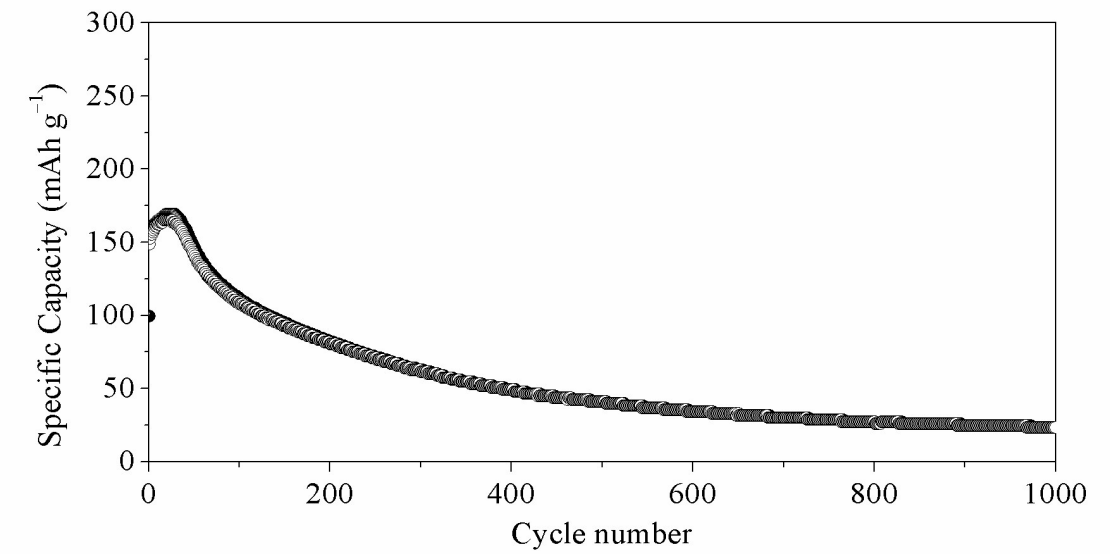

Fig. S3 Cycling performance of the $MoSe_2$ sample obtained with a reaction duration of 2 h at the current density of 1000 mA g^{-1}.

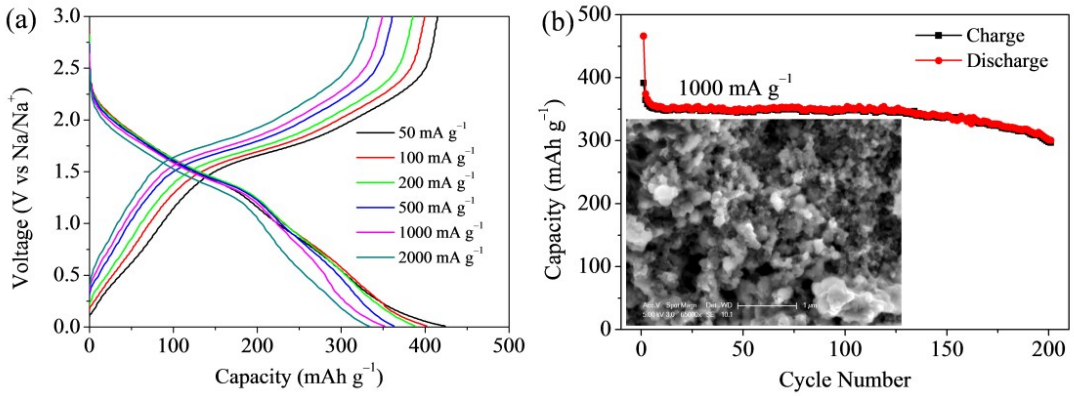

Fig. S4 (a) Representative discharge/charge curves of the $MoSe_2$ nanotube electrodes at various current densities over the voltage range of 0.01–3.0 V; (b) Cycling performance of the $MoSe_2$ nanotube electrode operated over the voltage range of 0.01–3.0 V, inset is an SEM image of the $MoSe_2$ electrode after 200 cycles at 1000 mA g^{-1}.

Table S1 Recent advance of sodium storage performance of $MoSe_2$-based electrodes.

Samples	Method	Potential Range (V)	Cycling Performance	Rate Performance	Ref
			Capacity (mAh g^{-1}) / Cycles / Current Density (mA g^{-1})	Capacity (mAh g^{-1}) / Current Density (mA g^{-1})	
Hierarchical nanotubes constructed from interlayer-expanded $MoSe_2$ nanosheets	Solvothermal method	0.5-3.0	228/1500/1000	304/50, 280/100, 262/200, 240/500, 223/1000, 200/2000	This work
		0.01-3.0	300/200/1000	424/50, 402/100, 389/200, 362/500, 352/1000, 333/2000	
Mesoporous nanospheres of 1T-$MoSe_2$	Solvothermal method	0.01-3.0	95/145/2000	270/1000, 225/2000, 160/5000	Nanoscale, 2017, 9, 1484–1490
Carbon-stabilized interlayer-expanded few-layer $MoSe_2$ nanosheets	Solvothermal method followed by post annealing	0.01-3.0	445/100/1000	367/5000	ACS Appl. Mater. Interfaces, 2016, 8, 32324−32332
$MoSe_2$ Nanosheets/rGO Composites	Hydrothermal method followed by post annealing	0.01-3.0	380/200/1000	NA	ChemNanoMat, 2015, 1, 409–414
$MoSe_2$@MWCNT Composite	Hydrothermal method followed by post annealing	0.01-3.0	459/90/200	446/500, 424/1000, 385/2000	Journal of Power Sources, 2015, 296, 2−9
Porous hollow carbon spheres decorated with $MoSe_2$ nanosheets	Hydrothermal method followed by post annealing	0.01-3.0	580/100/200	575/200, 510/500, 450/800, 400/1500	Nanoscale, 2015, 7, 10198–10203
$MoSe_2$ nanoplates	Pyrolysis	0.1-3.0	369/50/42(0.1C)	440/0.1C, 350/0.2C, 320/0.5C, 280/1C, 270/5C, 250/10C	Journal of Power Sources, 2015, 283, 187−194
$MoSe_2$ yolk–shell microspheres	Selenization by hydrogen selenide vapors	0.001-3.0	433/50/200	442/100, 382/500, 364/1000, 345/1500	Nanoscale, 2014, 6, 10511–10515
$MoSe_2$ nanoparticles embedded CNT balls	Selenization by hydrogen selenide vapors	0.001-3.0	296/200/1000	382/200, 346/500, 310/1500, 280/3000, 255/5000	Nanoscale, 2016, 8, 4209–4216