

## Supporting Information

### Carbon-supported T-Nb<sub>2</sub>O<sub>5</sub> nanospheres and MoS<sub>2</sub> composites with mosaic structure for insertion-conversion anode materials

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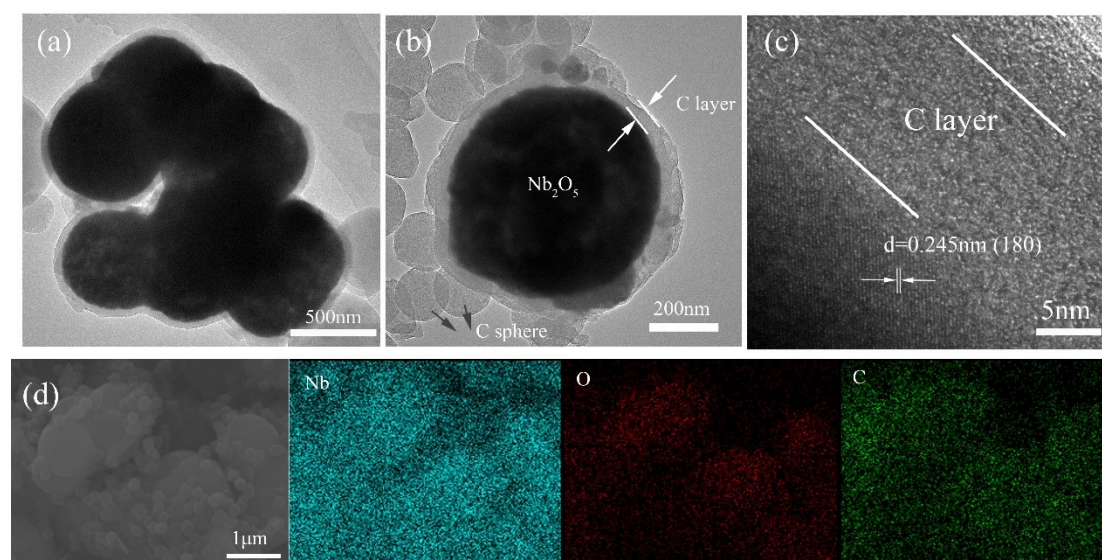


Fig. S1 (a, b) TEM images and (c) HRTEM image, (d) SEM images with Nb, O and C element sections of T-Nb<sub>2</sub>O<sub>5</sub>@C.

Table S1 Mass percentages of Nb, Mo atoms and Nb/Mo mole ratios obtained by ICP tests

Sample	Nb	Mo	Nb/Mo molar ratio
Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-2-1	35.2433%	12.2744%	2.97
Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-1-1	24.9227%	16.4475%	1.57
Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-1-2	11.4406%	20.4889%	0.58

Table S2 Mass percentage of each component in T-Nb<sub>2</sub>O<sub>5</sub>@MoS<sub>2</sub>@C composites obtained by

TG-DSC tests

Sample	Component	TG-DSC tests					Nb/Mo molar ratio
		Nb <sub>2</sub> O <sub>5</sub>	MoS <sub>2</sub>	C	Nb	Mo	
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-2-1		45.02%	18.37%	36.61%	33.85%	11.48%	2.94
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-1-1		35.23%	27.19%	37.58%	26.49%	16.99%	1.56
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-1-2		20.39%	42.58%	37.03%	15.33%	26.61%	0.57

Table S3 BET results of T-Nb<sub>2</sub>O<sub>5</sub>@C and T-Nb<sub>2</sub>O<sub>5</sub>@MoS<sub>2</sub>@C series samples

Sample	BET results		
	Specific surface area (m <sup>2</sup> g <sup>-1</sup> )	Pore volume (cm <sup>3</sup> g <sup>-1</sup> )	Micropore volume (cm <sup>3</sup> g <sup>-1</sup> )
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-2-1	436.2	0.394	0.058
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-1-1	420.7	0.405	0.112
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-1-2	367.2	0.246	0.087
T-Nb <sub>2</sub> O <sub>5</sub> @C	128	0.12	0.013

Table S4 The rate performance of T-Nb<sub>2</sub>O<sub>5</sub>@C and T-Nb<sub>2</sub>O<sub>5</sub>@MoS<sub>2</sub>@C series samples (mAh g<sup>-1</sup>).

Sample	Current densities (A g <sup>-1</sup> )					turn back to 0.1
	0.1	0.25	0.5	1	2	
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-2-1	460	375	293	216	129	413
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-1-1	518	404	349	277	194	477
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C-1-2	497	402	315	227	140	427
T-Nb <sub>2</sub> O <sub>5</sub> @C	350	263	211	157	109	318

Table S5 The comparison of capacity performance in between present material  
(T-Nb<sub>2</sub>O<sub>5</sub>@MoS<sub>2</sub>@C) with other related electrode materials.

Materials	After cycles	Current density (A g <sup>-1</sup> )	Specific capacity (mAh g <sup>-1</sup> )	Capacity retained(%)	Ref
T-Nb <sub>2</sub> O <sub>5</sub> @NbS <sub>2</sub> @C	500	2	102	51	[4]
Nb <sub>2</sub> O <sub>5</sub>	100	0.2	175	74.4	[8]
MoO <sub>3</sub> -rGO	100	0.5	568	71	[13]
Nb <sub>2</sub> O <sub>5</sub> /carbon	600	1	240	96	[14]
ASC/Nb <sub>2</sub> O <sub>5</sub>	1200	1	62	50.8	[15]
Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> CNFs	1000	1	140	69.6	[17]
MoS <sub>2</sub> /C	200	1	415	107.8	[18]
MoS <sub>2</sub>	100	0.1	446	54.1	[19]
Nb <sub>2</sub> O <sub>5</sub> /SMCNTs	100	0.04	441	98	[23]
Nb <sub>2</sub> O <sub>5</sub> -C-rGO	5000	20	107	70	[27]
Nb <sub>2</sub> CT <sub>x</sub> /MoS <sub>2</sub> @CS	800	1	184	49.2	[29]
T-Nb <sub>2</sub> O <sub>5</sub> @C	2000	2	169.6	88.9	[31]
Nb <sub>2</sub> O <sub>5</sub> @rGO	1000	2	122	81.9	[32]
Nb <sub>2</sub> O <sub>5</sub> HNS@S rGO	1000	1	140	66.6	[34]
Nb <sub>2</sub> O <sub>5</sub> /C	100	0.5	150	75	[40]
Nb <sub>2</sub> O <sub>5</sub> @Carbon	7000	2	130	81	[47]
T-Nb <sub>2</sub> O <sub>5</sub> @MoS <sub>2</sub> @C	1000	2	187	84.8	This work

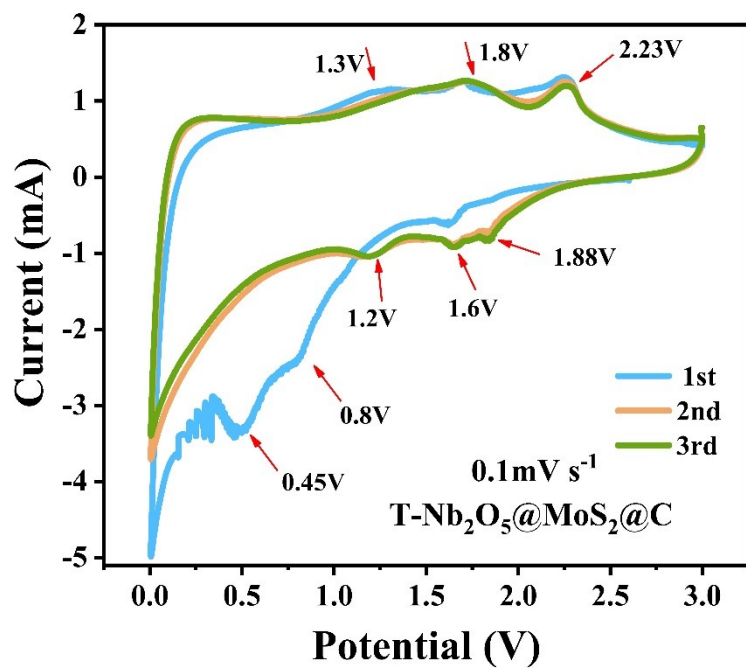


Fig. S6 The CV curves of T-Nb<sub>2</sub>O<sub>5</sub>@MoS<sub>2</sub>@C electrode at a scan rate of 0.1 mV s<sup>-1</sup>

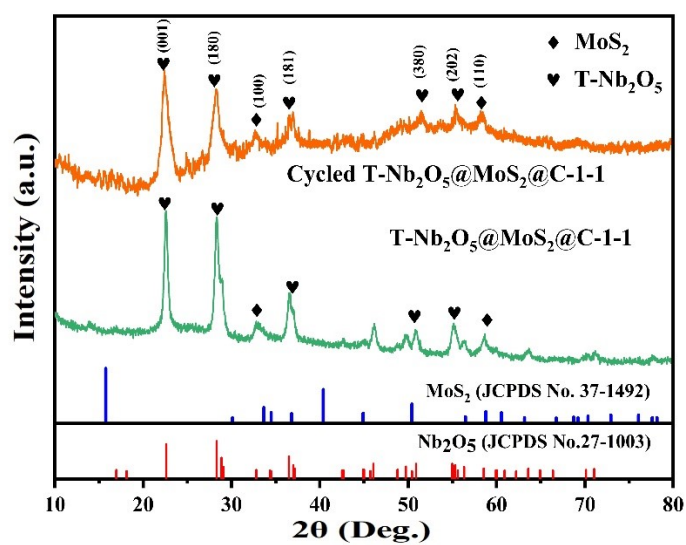


Fig. S7 XRD of T-Nb<sub>2</sub>O<sub>5</sub>@MoS<sub>2</sub>@C-1-1 cycled electrode and T-Nb<sub>2</sub>O<sub>5</sub>@MoS<sub>2</sub>@C-1-1 electrode