Supplementary Information (SI) for New Journal of Chemistry.

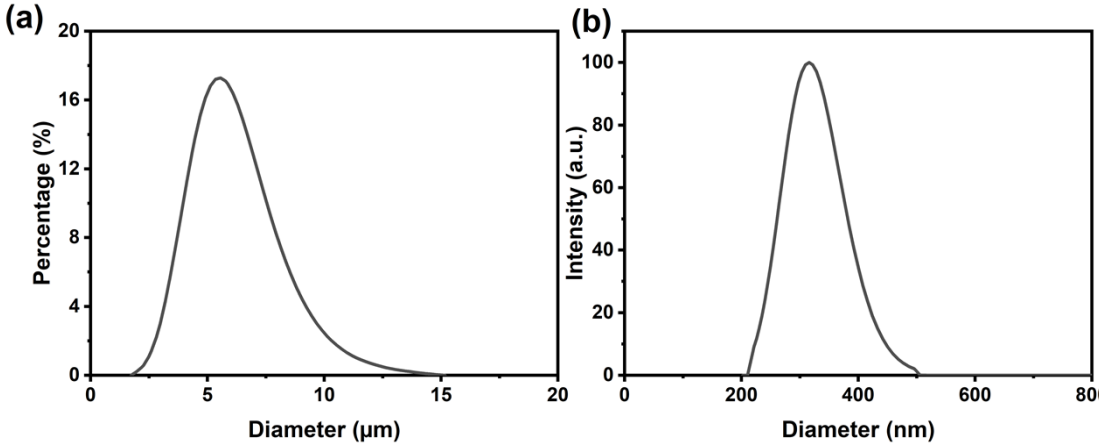

Fig. S1. Particle size distribution of (a)$MSiO_x$, (b) $NSiO_x$.

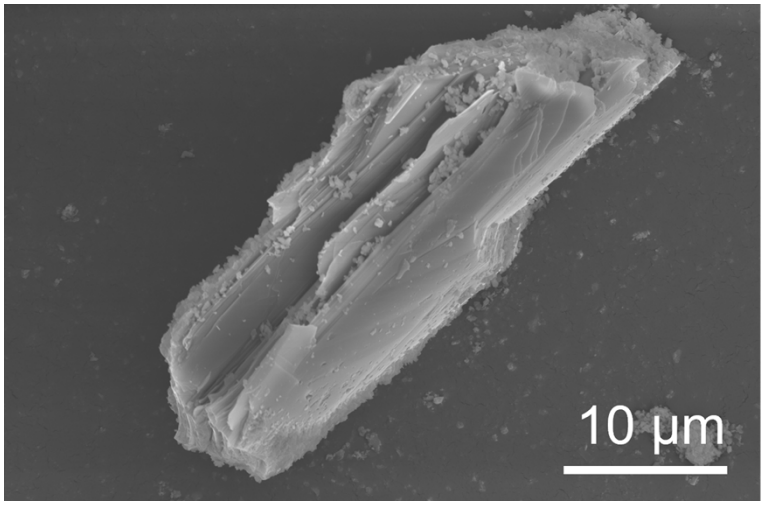

Fig. S2. SEM images of $NSiO_x$/NPC-1 precursor

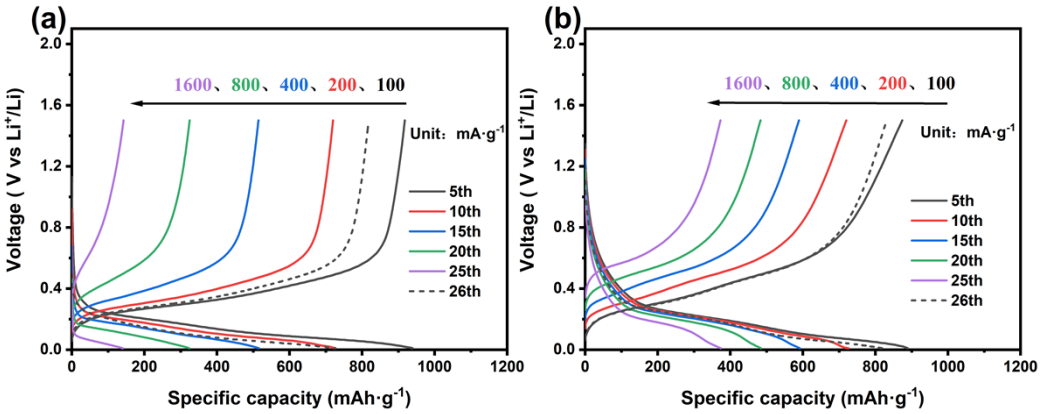

Fig. S3. Charge-discharge curves of (a) $NSiO_x$ and (b)$NSiO_x$/NPC-1 at different current densities

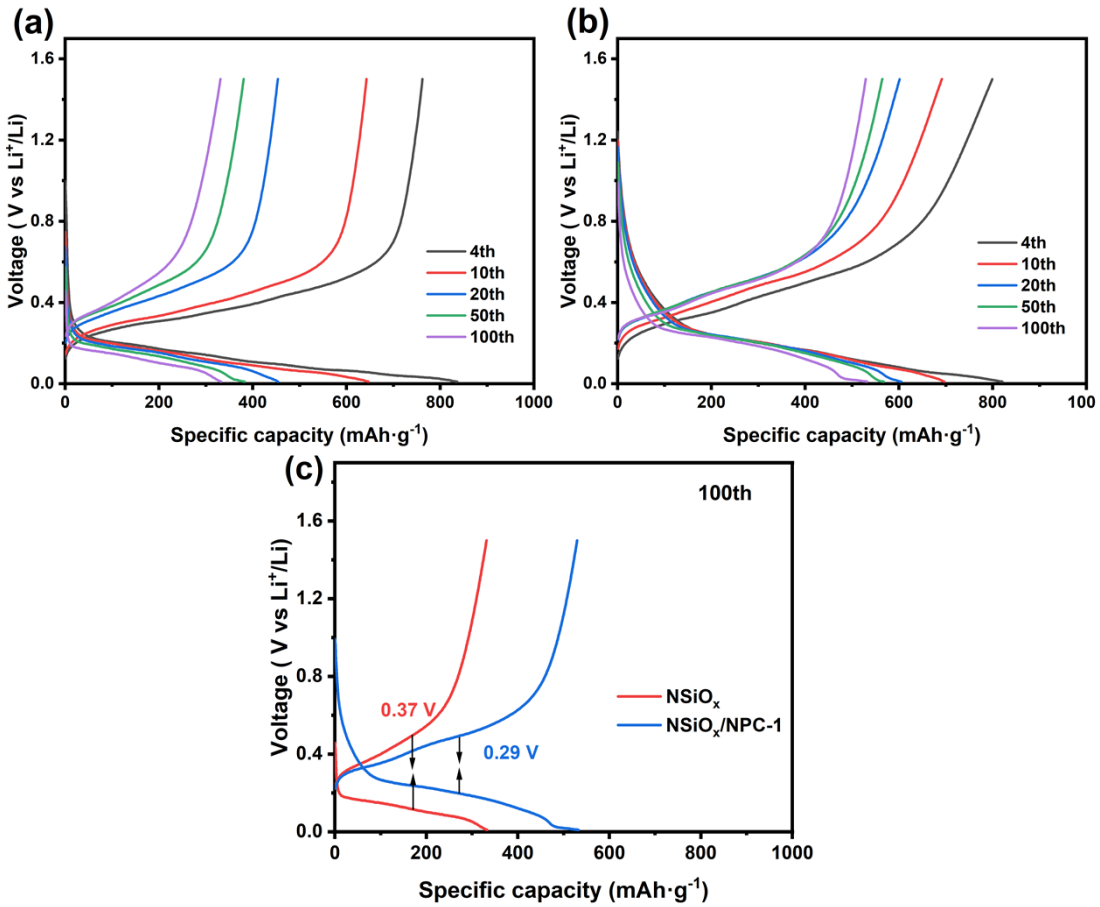

Fig. S4. Charge-discharge curves of (a) $NSiO_x$ and (b)$NSiO_x$/NPC-1 at a current of 400 mA·g^{-1}; (c) Comparison of median voltage difference between $NSiO_x$ and $NSiO_x$/NPC-1

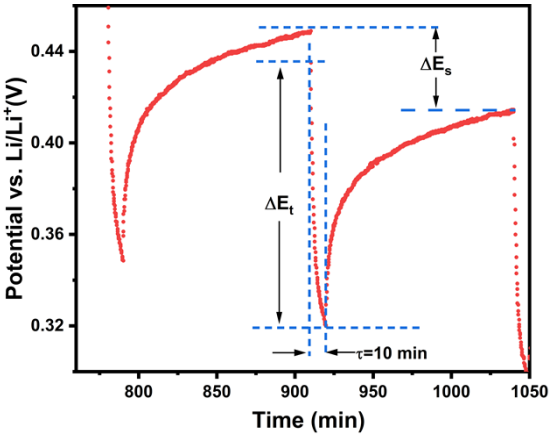

Fig. S5. A selected single step of the GITT test

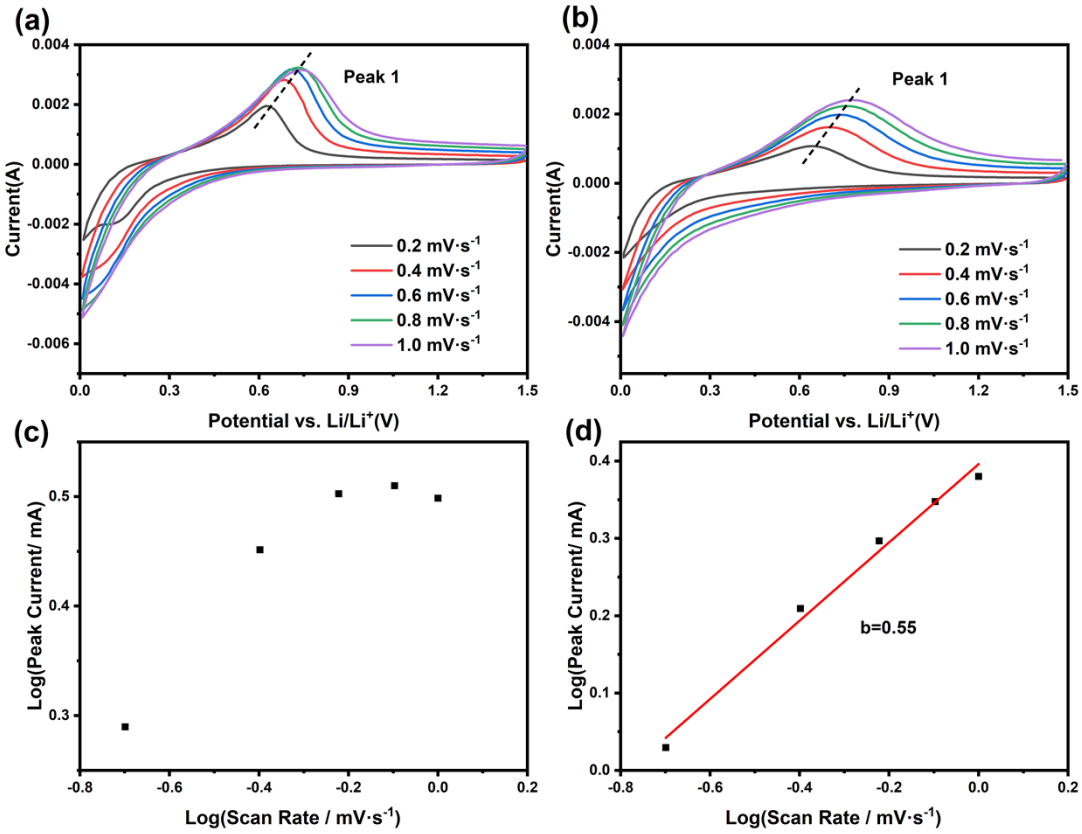

Fig. S6. CV curves at various scan rates of (a) $NSiO_x$ and (b) $NSiO_x$/NPC-1; Log(i) versus log(v) plots of peak 1 of (c) $NSiO_x$ and (d) $NSiO_x$/NPC-1

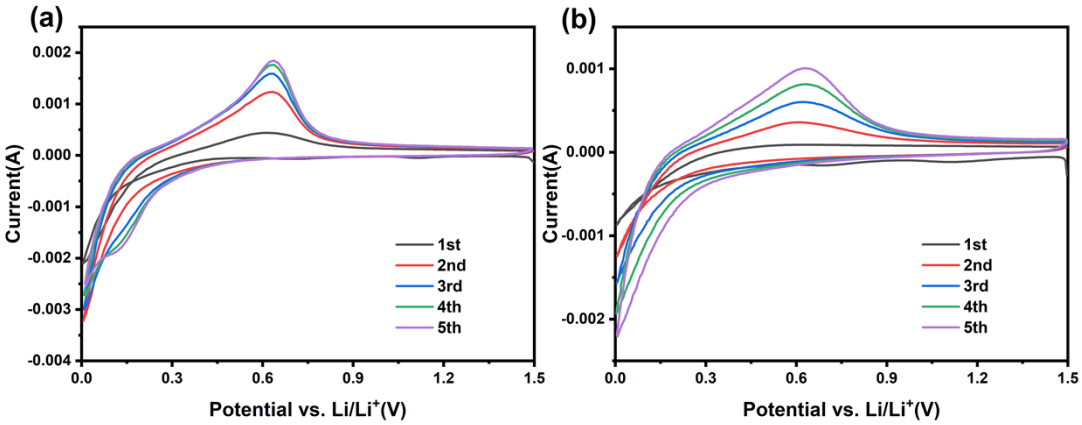

Fig. S7. Cyclic voltammetry curves of (a) $NSiO_x$ and (b) $NSiO_x$/NPC-1

Table. S1. A summary of the rate performances of different SiO_x/C composites in comparison with this work.

Sample	Rate performance							Reference
This work	Current density $mA \cdot g^{-1}$	100	200	400	800	1600		
	Specific capacity $mAh \cdot g^{-1}$	882.8	760.2	619.9	500.7	386.4		
H-SiO_x/NC	Current density $mA \cdot g^{-1}$	100	300	500	800	1000	2000	45
	Specific capacity $mAh \cdot g^{-1}$	823	614	549	474	437	327	
Si/SiO_x@NC-650	Current density $mA \cdot g^{-1}$	100	200	500	1000	2000		46
	Specific capacity $mAh \cdot g^{-1}$	896	665	440	310	225		
N-C/SiO_x-R4	Current density $mA \cdot g^{-1}$	100	200	500	1000	1500	2000	47
	Specific capacity $mAh \cdot g^{-1}$	719.2	654.7	525	375.9	285.5	214.3	
2D NPC/C@Si	Current density $mA \cdot g^{-1}$	200	500	1000	2000			48
	Specific capacity $mAh \cdot g^{-1}$	561	489	419	332			
SiO_x@C-L	Current density $mA \cdot g^{-1}$	100	200	400	800	1600		49
	Specific capacity $mAh \cdot g^{-1}$	1100	970	810	570	330		
SiO_x@CNTs	Current density $mA \cdot g^{-1}$	100	200	400	800	1600		50
	Specific capacity $mAh \cdot g^{-1}$	799	726	632	497	339		
NGA-SiOC25	Current density $mA \cdot g^{-1}$	74	148	370	740			51
	Specific capacity $mAh \cdot g^{-1}$	628	565	462	351			
SiO_x@C-GA	Current density $mA \cdot g^{-1}$	100	200	500	1000			52
	Specific capacity	700	569	433	355			

$mAh \cdot g^{-1}$

Table. S2. Fitting results of R_{SEI} and R_{ct} for different electrode materials.

Sample	R_{SEI}/Ω	R_{ct}/Ω
$MSiO_x$	179.3	174.5
$NSiO_x$	222.0	142.8
$NSiO_x$/NPC-1	54.0	68.7
$NSiO_x$/NPC-2	63.7	99.5