Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information for

Carbon-based Artificial SEI Layers for Aqueous Lithium-ion Battery Anodes

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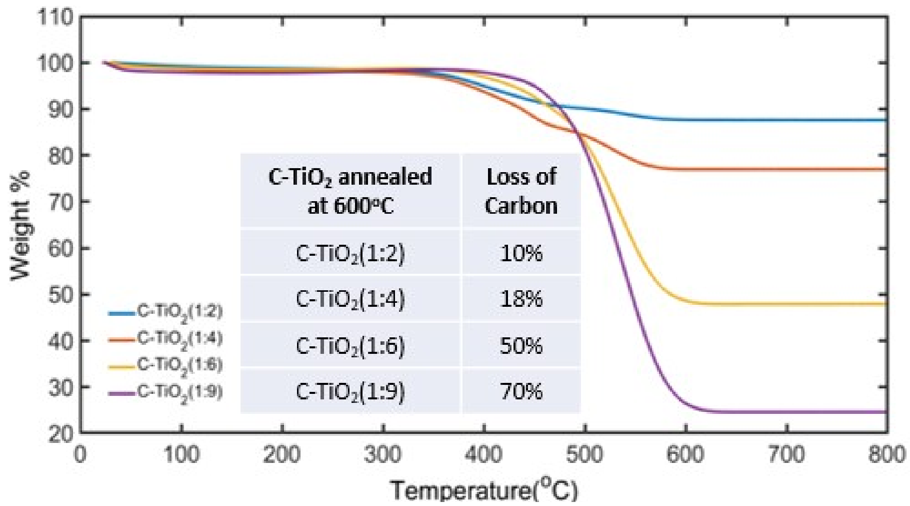


Figure S1. TGA of C-TiO_2 with different ratios of precursors (annealed at 600 ºC) with a heating rate of 10 °C min^{-1} under air.

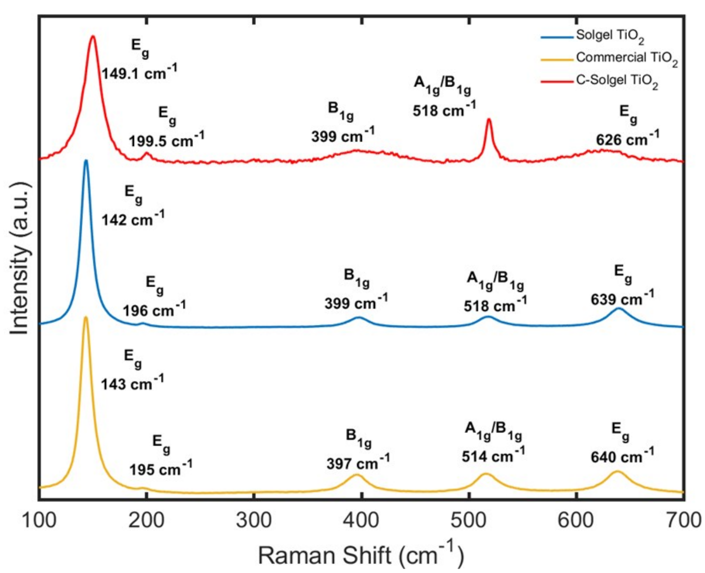


Figure S2. Raman spectra of commercially obtained anatase TiO_2 nanoparticles, sol–gel TiO_2 nanoparticles, and C-TiO_2 (synthesized with a precursor ratio of 1:4 and annealed at 600 ºC). The peak shifts and relative intensities of C-TiO_2 are very similar to that of the anatase phase.

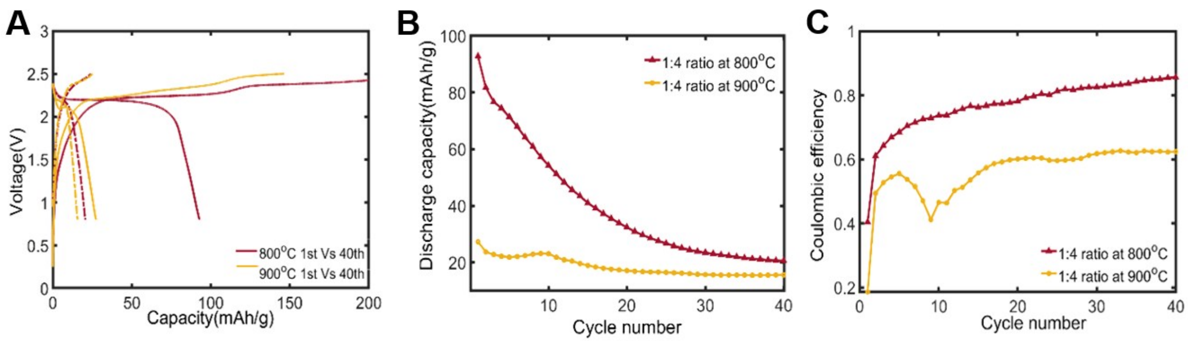


Figure S3. The full cell performance of C-TiO_2 anodes with different annealing temperature of carbon layer. The precursor ratio for TiO_2 synthesis was fixed as 1:4 (TiO_2:glucose). (A) Voltage profiles of aqueous batteries at the 1st and 40th cycle tested with C-TiO_2 anodes annealed at 800 ^oC and 900 ^oC. (B) Cycling performance and (C) corresponding Coulombic efficiency of C-TiO_2 anodes annealed at 800 ^oC and 900 ^oC.

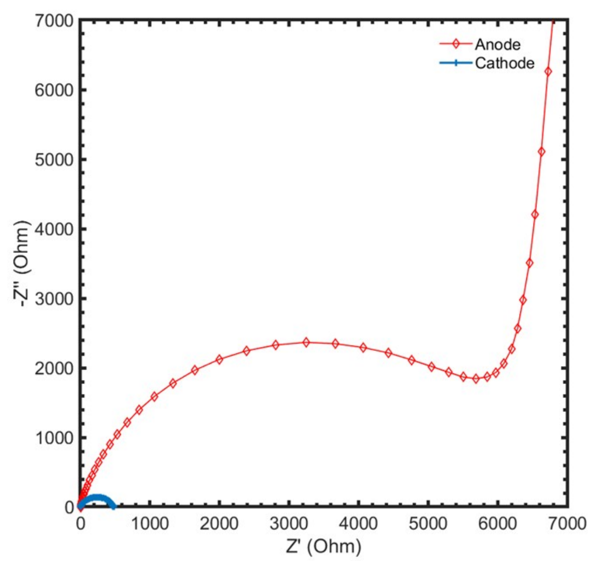
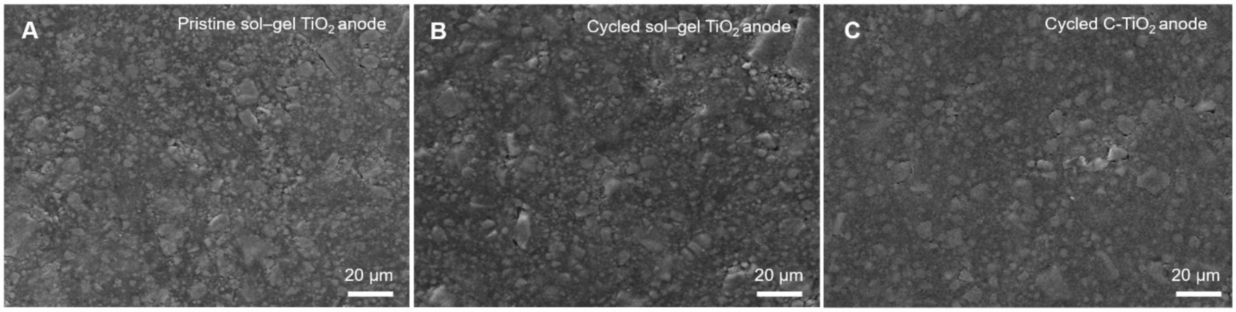
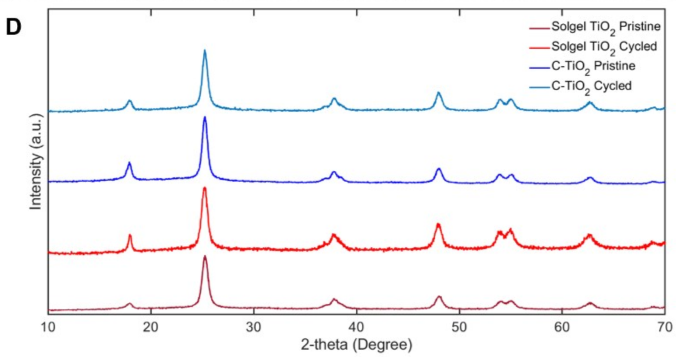


Figure S4. Nyquist plots from the symmetric cathode and uncoated anode cells cycled after 100 cycles. The overall impedance of the cathode is small compared to the anode, showing that the majority of the cell impedance evolution originates from the anode.





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Sample	a (Å)	b (Å)	c (Å)
Pristine sol–gel TiO_2 anode	3.78	3.78	9.49
Cycled sol–gel TiO_2 anode	3.79	3.79	9.49
Pristine C-TiO_2 anode	3.78	3.78	9.5
Cycled C-TiO_2 anode	3.79	3.79	9.49

Figure S5. SEM images of anodes made of (A) sol–gel TiO_2 at the pristine state, (B) sol–gel TiO_2 cycled 100 times, and (C) C-TiO_2 (synthesized with 1:4 of precursor ratio and annealed at 600 °C) cycled 100 times. (D) XRD patterns of sol–gel TiO_2 and C-TiO_2 electrodes at their pristine states, and sol–gel TiO_2 and C-TiO_2 electrodes after cycling 60 times. (E) Lattice parameters of XRD patterns in (D).

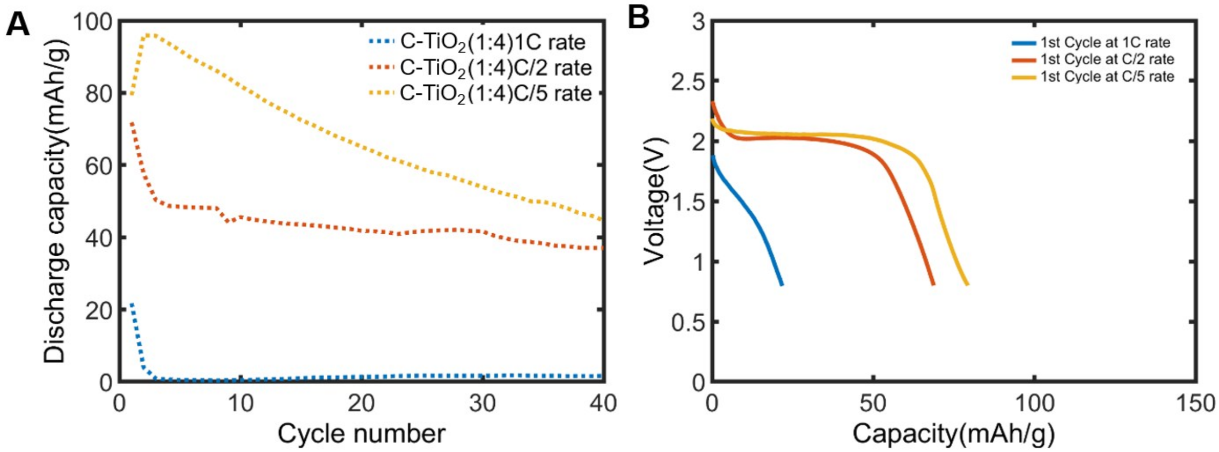

Figure S6. The cycling performance (A) and the first discharge voltage profile (B) of C-TiO_2 anodes (synthesized with 1:4 of precursor ratio and annealed at 600 ^{o}C) tested at different C rates.