Supporting information

β-$NaMnO_2$: a High Performance Cathode for Sodium-Ion Batteries

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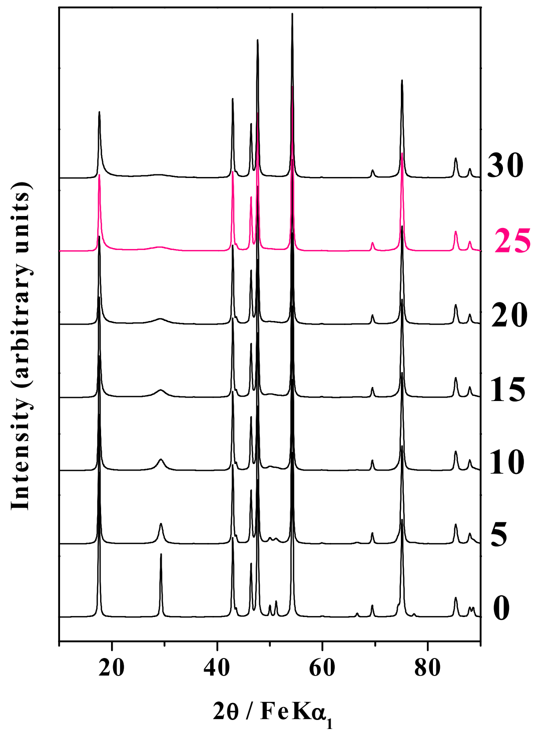
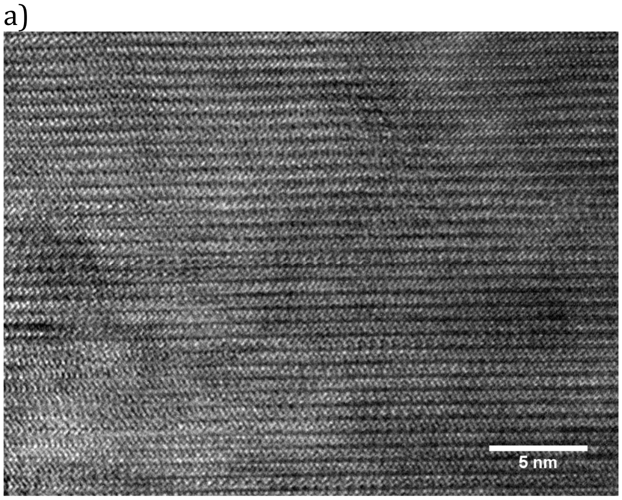


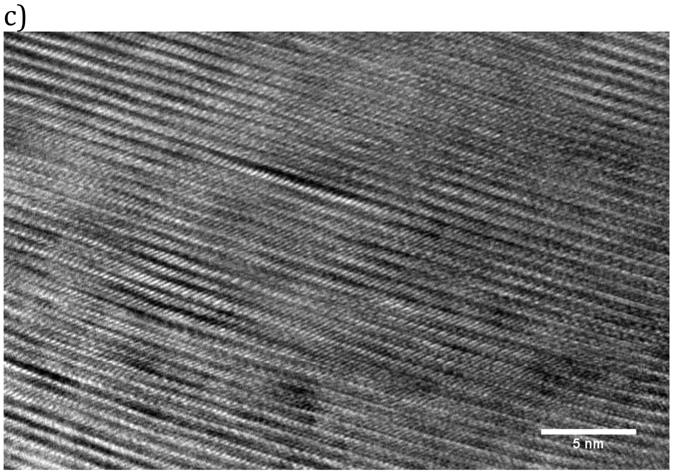
Figure S1. Simulation of β-$NaMnO_2$ with various percentages of stacking faults (from 0% to 30%). The pink pattern represents the simulation closest to the experimental pattern

a)



b)

c)



d)

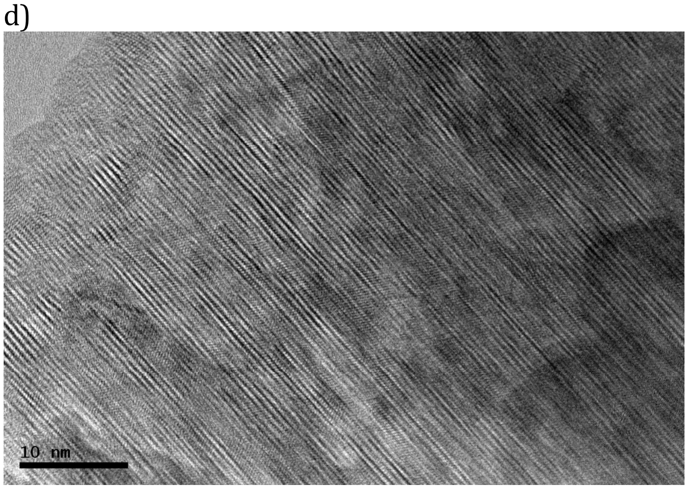


Figure S2. HRTEM images of β-$NaMnO_2$: a) as-prepared; b) at the end of charge, at 4.2 V *vs.* Na^+/Na; c) at the end of discharge, at 2V *vs.* Na^+/Na; d) after 5 full charge/discharge cycles.

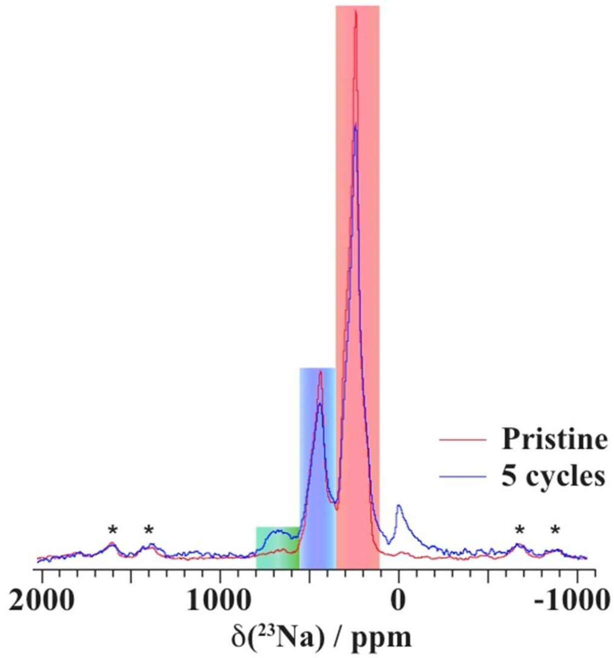


Figure S3. Comparison of the ^{23}Na NMR spectra acquired on the β-$NaMnO_2$ pristine phase and after the 5th discharge. Spinning sidebands are denoted with (*). The three regions containing the resonances of Na atoms in a pure α environment, in a pure β environment, and in the vicinity of a stacking fault are highlighted in green, red, and blue, respectively. The peak near 0 ppm is due to Na^+ in a diamagnetic environment, most probably from residual electrolyte or its decomposition products formed during cycling.

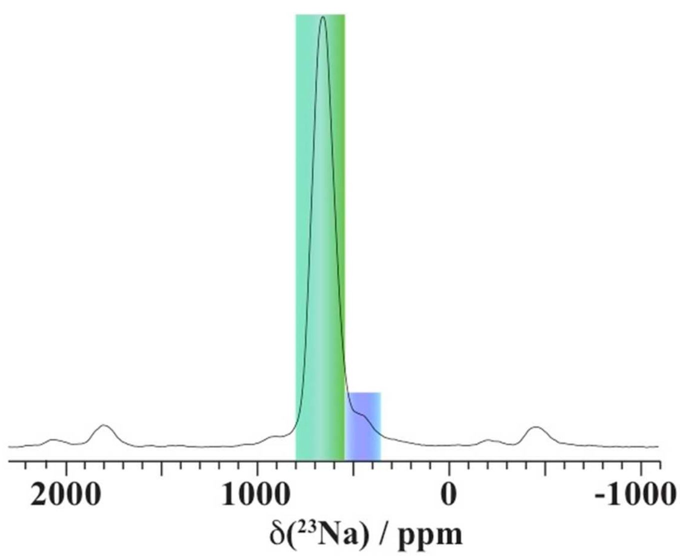


Figure S4. *Ex situ* ^{23}Na spin echo NMR spectra obtained on the pristine α-$NaMnO_2$ phase under an external field of 200 MHz and at a spinning frequency of 60 kHz. The two regions containing the resonances of Na atoms in a pure α environment and in the vicinity of a stacking fault are highlighted in green and blue, respectively

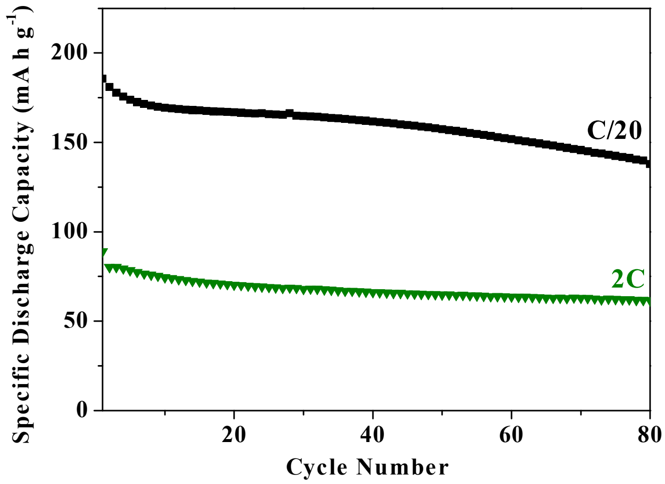


Figure S5. Values of specific discharge capacities for β-$NaMnO_2$ cycled between 2 and 4.2 V *vs.* Na^+/Na at room temperature. 80 cycles are presented for each rate. Charge and discharge rates were identical. Black symbols correspond to a rate of C/20 and green symbols to 2C.

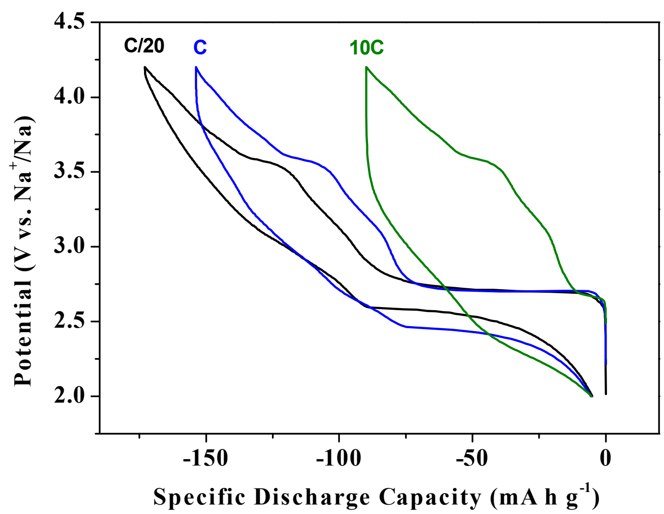


Figure S6. Load curves at high and low rate obtained on cycle 5 between 2-4.2 V *vs.* Na^+/Na. The cycling rate is indicated on the corresponding load curve.

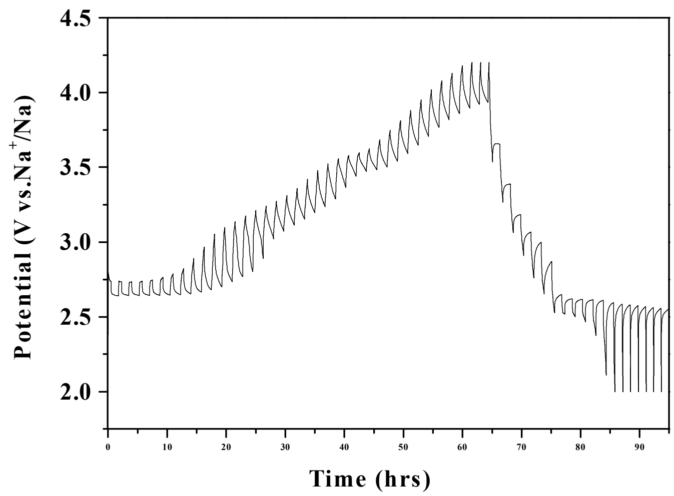


Figure S7. Results from the Galvanostatic Intermittent Titration Technique between 2-4.2 V *vs.* Na^+/Na. A current of 20 mA g^{-1} was applied for 30 min followed by a resting period of 75 min.