Supporting Information

Synthesis of Intrinsically Sodium Intercalated Ultra-Thin Layered MnO₂ and its Ionic Charge Transport

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Figure S1 a. Optical micrograph of a 2D Na-MnO₂ nanosheet grown on a sapphire substrate and **b.** corresponding AFM map of the nanosheet with a thickness of 4.2 nm. **c.** SEM image of the 2D Na-MnO₂ nanosheet with sharp edges. **d.** A close-up SEM image of the nanosheet shows the uniform surface of the 2D Na-MnO₂.



Figure S2. SAED pattern obtained along a -7° tilted angle with respect to the [001] zone axis.



Figure S3. Mn 3s XPS scan showing a 5.1 eV multiplet splitting, indicative of a mixed Mn oxidation state (Mn^{3+}/Mn^{4+}) .



Figure S4. Endurance testing over eight consecutive cycles. LRS/HRS ratio was calculated at the read voltage of (a) 6 V and (b) -6 V.



Figure S5 a. DC I–V curves with 10 different devices to verify device-to-device variation. **b**. Current variations at a read voltage of \pm 5V for 10 different devices.



Figure S6. DC I–V sweep of the Au-contacted Na- MnO_2 device (a) in ambient (40-60% relative humidity), (b) under vacuum (0% relative humidity), and (c) in highly humid conditions (100% relative humidity). The compliance current is set at 50 nA. The image of the device is shown in the inset.