Supporting Information for

## Exploring the Charge Compensation Mechanism of P2-Type Na0.6Mg0.3Mn0.7O2 Cathode Materials for Advanced Sodium-Ion Batteries

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**Figure S1.** The dQ/dV curves for the corresponding charge/discharge curves as a function of charging time



**Figure S2.** Charge/discharge curves for the first two cycles at C/20 between 4.5 and 1.5 V (vs. Na+/Na).



**Figure S3.** (a) The spectral difference between Mn L-edge TEY of 1 Ch 4.5 V and that of 2 Ch 4.5 V. (b) The spectral difference between Mn L-edge TEY of 1 Ch 4.5 V and that of 10 Ch 4.5 V. (c) The spectral derivative of 1 Ch 4.5 V, 2 Ch 4.5 V and 10 Ch 4.5 V, respectively. (d) The differential spectra between Mn L-edge TEY of 1 Dis 1.5 V and that of 2 Dis 1.5 V. (e) The spectra derivative of 1 Dis 1.5 V.



**Figure S4.** (a) The Mn L-edge XAS spectra (TFY mode) collected on NaMMO electrodes as a function of SOCs during the initial cycle. (b) The Mn L-edge XAS spectra (TFY mode) collected on NaMMO electrodes as a function of SOCs after 5 and 10 cycles.