

## Supplementary Information

### Harnessing Neutral $\text{Ca}(\text{NO}_3)_2$ Electrolyte in $\text{CaMnO}_3$ Perovskite Systems for Calcium-ion Supercapacitors

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**Table S1:** Specific capacitance values of  $\text{CaMnO}_3$  electrode material calculated from the CV curves at -0.4V - 1.5V potential window.

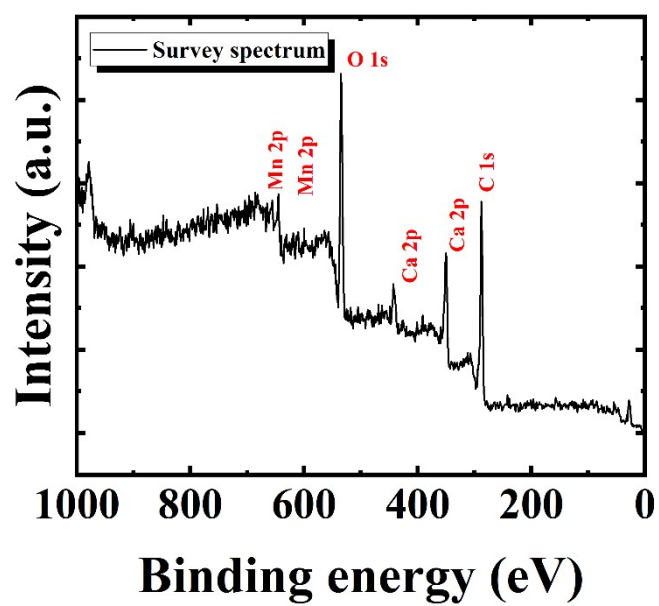
Scan Rate ( $\text{mV s}^{-1}$ )	Capacitance ( $\text{F g}^{-1}$ )
5	208.42
10	158.95
25	98.65
50	70.29
75	56.21
100	44.47

**Table S2:** Specific capacitance values of  $\text{CaMnO}_3$  calculated from GCD curves at potential window of -0.4V - 1.5 V.

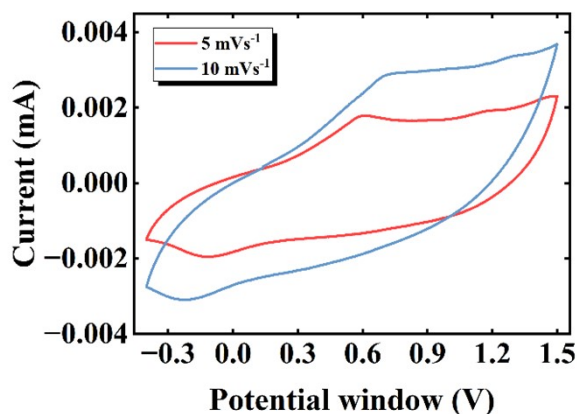
Specific Current ( $\text{A g}^{-1}$ )	Capacitance ( $\text{F g}^{-1}$ )
0.5	258.60
1	244.00
2	167.00
3	146.00
5	100.00
8	74.00
10	54.47
12	42.90

**Table S3:** EDAX analysis showing atomic % of Ca, Mn, O in CaMnO<sub>3</sub>.

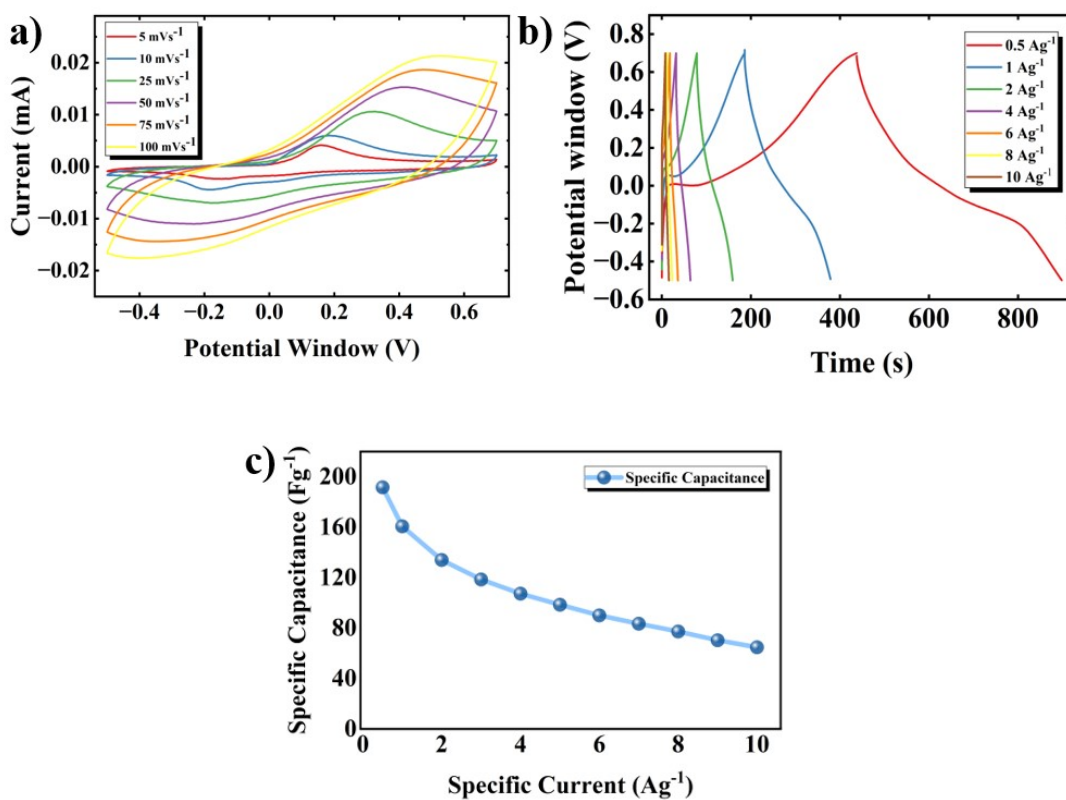
Element	Atom %
O	47.83
Ca	26.48
Mn	25.69
Total	100.00



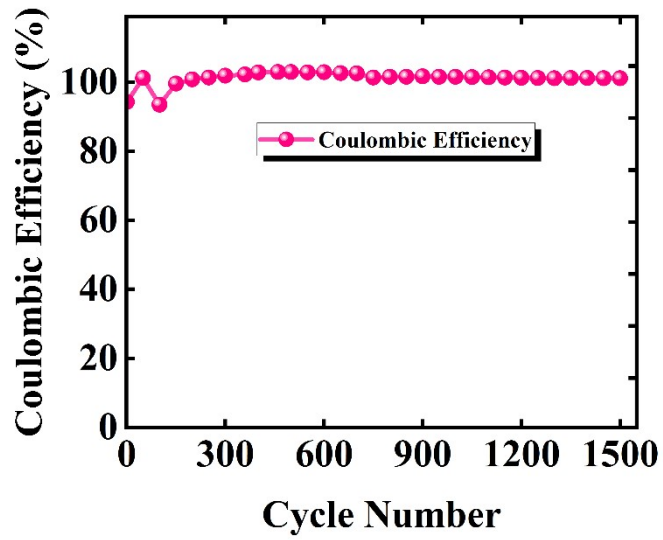
**Figure S1 :** Survey spectrum from XPS of CaMnO<sub>3</sub>.



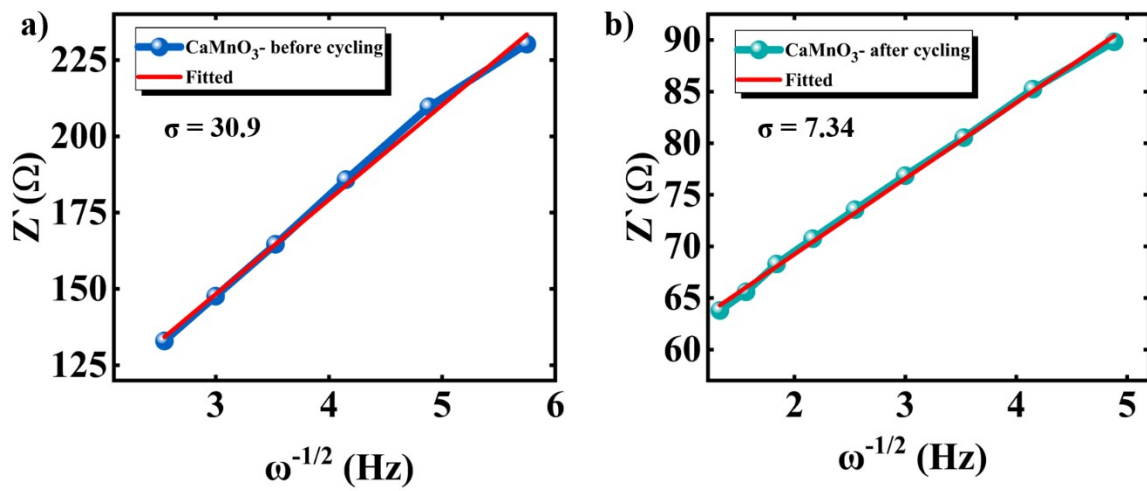
**Figure S2:** Cyclic voltammogram of  $\text{CaMnO}_3$  in  $0.5\text{M Ca}(\text{NO}_3)_2$  in the potential window of  $-0.4 - 1.5\text{ V}$  with anodic and cathodic peaks at  $0.58$  and  $-0.12\text{ V}$  respectively.



**Figure S3:** **a)** CV curves of  $\text{CaMnO}_3$  in  $1\text{M KOH}$  within the potential window of  $-0.5 - 0.7\text{ V}$  at different scan rates ( $5 - 100\text{ mVs}^{-1}$ ). **b)** GCD curves of  $\text{CaMnO}_3$  in  $1\text{M KOH}$  within the potential window of  $-0.5 - 0.7\text{ V}$ . **c)** Specific capacitance calculated from GCD in the potential window of  $-0.5 - 0.7\text{ V}$ .



**Figure S4:** Coulombic efficiency of CaMnO<sub>3</sub> electrode material in 0.5M Ca(NO<sub>3</sub>)<sub>2</sub> electrolyte.



**Figure S5:** Plot of  $Z'$  vs  $\omega^{-1/2}$  of CaMnO<sub>3</sub> a) before cycling b) after cycling

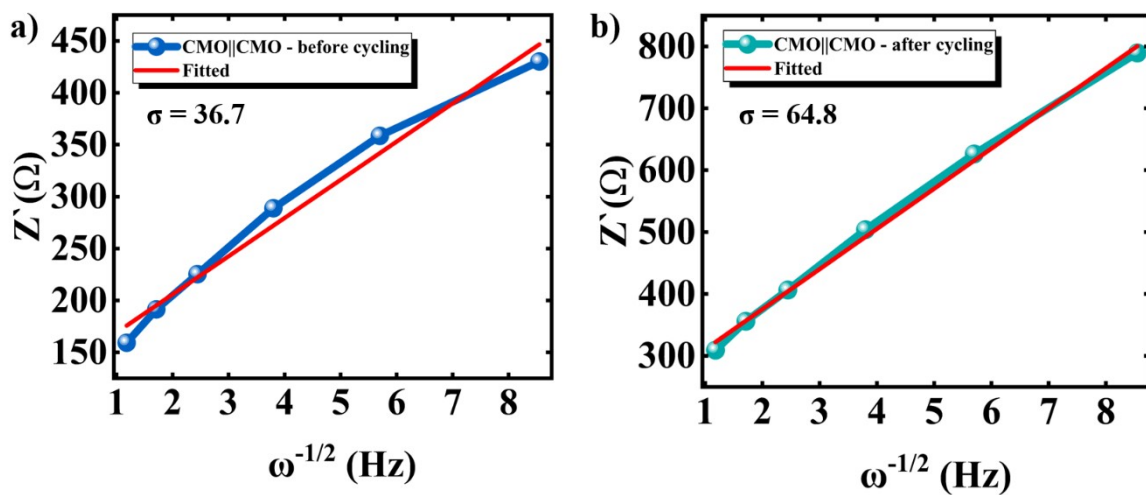


Figure S6: Plot of  $Z'$  vs  $\omega^{-1/2}$  of CMO||CMO Symmetric supercapacitor a) before cycling  
b) after cycling

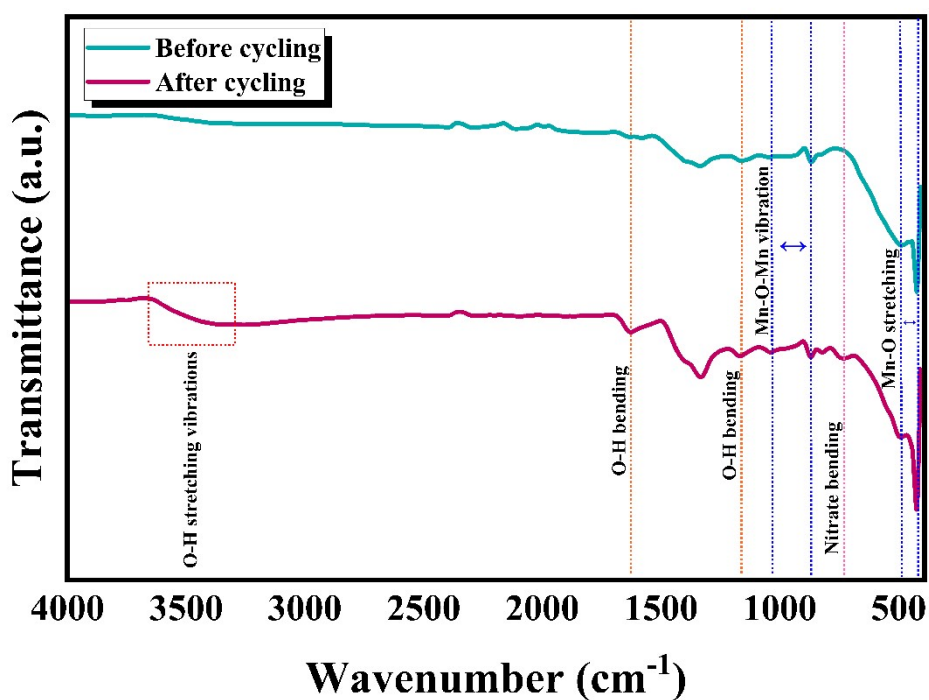


Figure S7: FTIR spectra of  $\text{CaMnO}_3$  electrode before and after electrochemical cycling in 0.5M  $\text{Ca}(\text{NO}_3)_2$  showing MnOOH formation.