

## Supporting Information

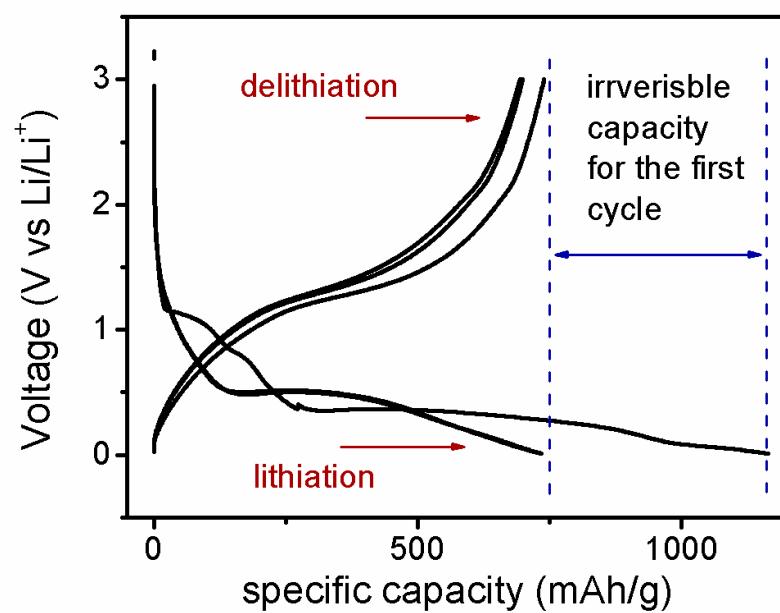
### Porous manganese oxide generated from lithiation/delithiation with improved electrochemical oxidation for supercapacitors

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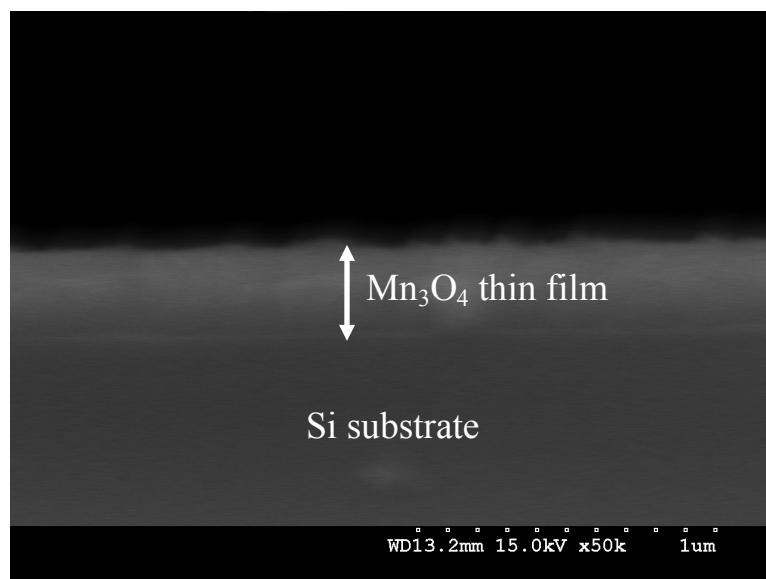
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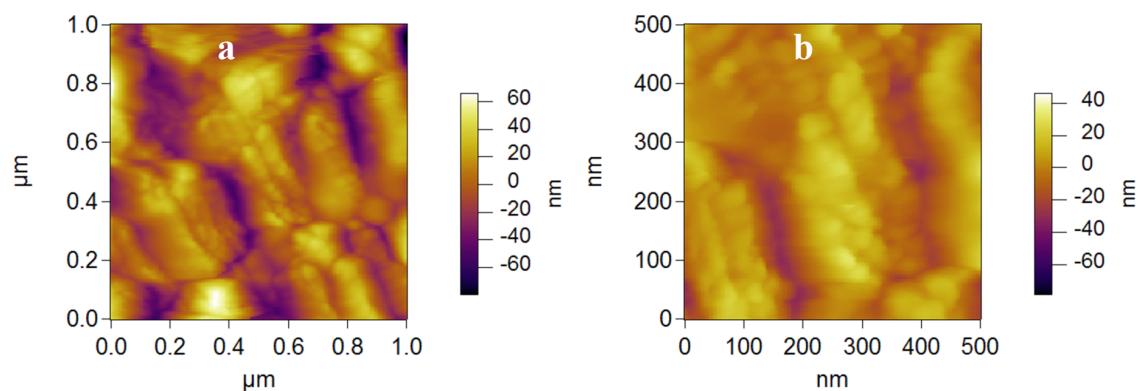
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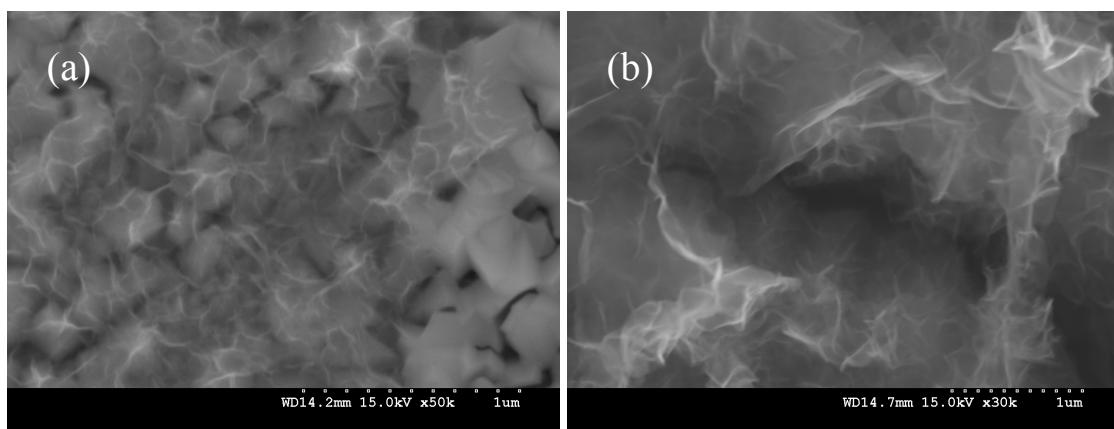
**Fig. S1.** Three cycles charge/discharge curves of a  $\text{Mn}_3\text{O}_4$  thin film sample for the lithiation/delithiaion process.



**Fig. S2.** Cross-section FESEM image of a Mn<sub>3</sub>O<sub>4</sub> thin film deposited on a Si substrate by PLD.



**Fig. S3.** (a) and (b) AFM images of the  $\text{MnO}_x$  thin film sample.



**Fig. S4.** (a) High magnification FESEM image of a  $\text{Mn}_3\text{O}_4$  thin film after potential scans.  
(b) High magnification FESEM image of a nanoporous  $\text{MnO}_x$  thin film after potential scans.