

Highly reversible conversion-capacity of MnO_x -loaded ordered mesoporous carbon nanorods for lithium-ion battery anodes

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Electronic Supplementary Information

1. Small angle XRD

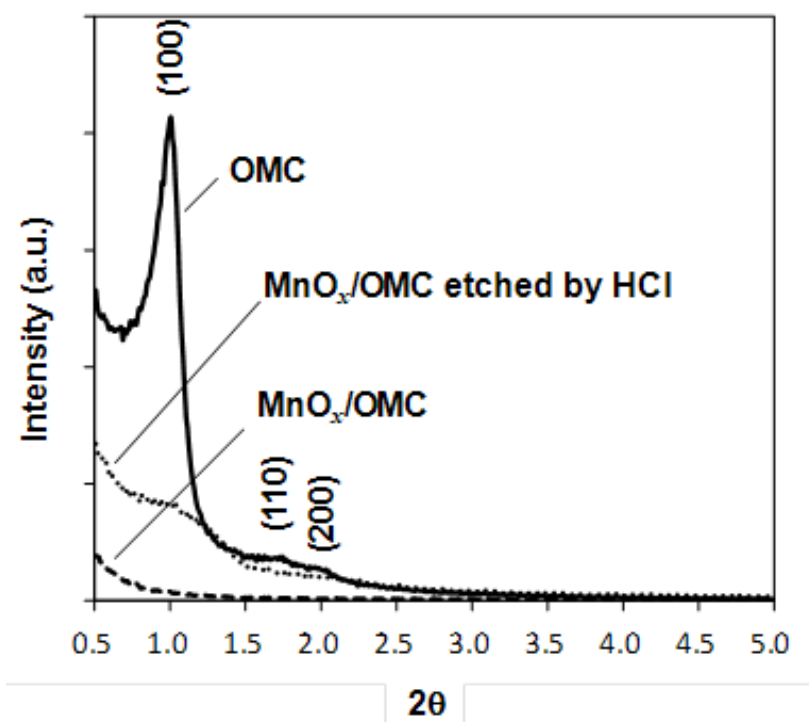


Figure S1. Small angle XRD patterns of OMC, MnO_x/OMC and MnO_x/OMC etched by HCl. For the HCl etching, MnO_x/OMC (1g) was treated with HCl solution (10g, 35%) for 3 h at room temperature. The complete removal of MnO_x in MnO_x/OMC by HCl etching was confirmed by XRD.

2. BET measurements

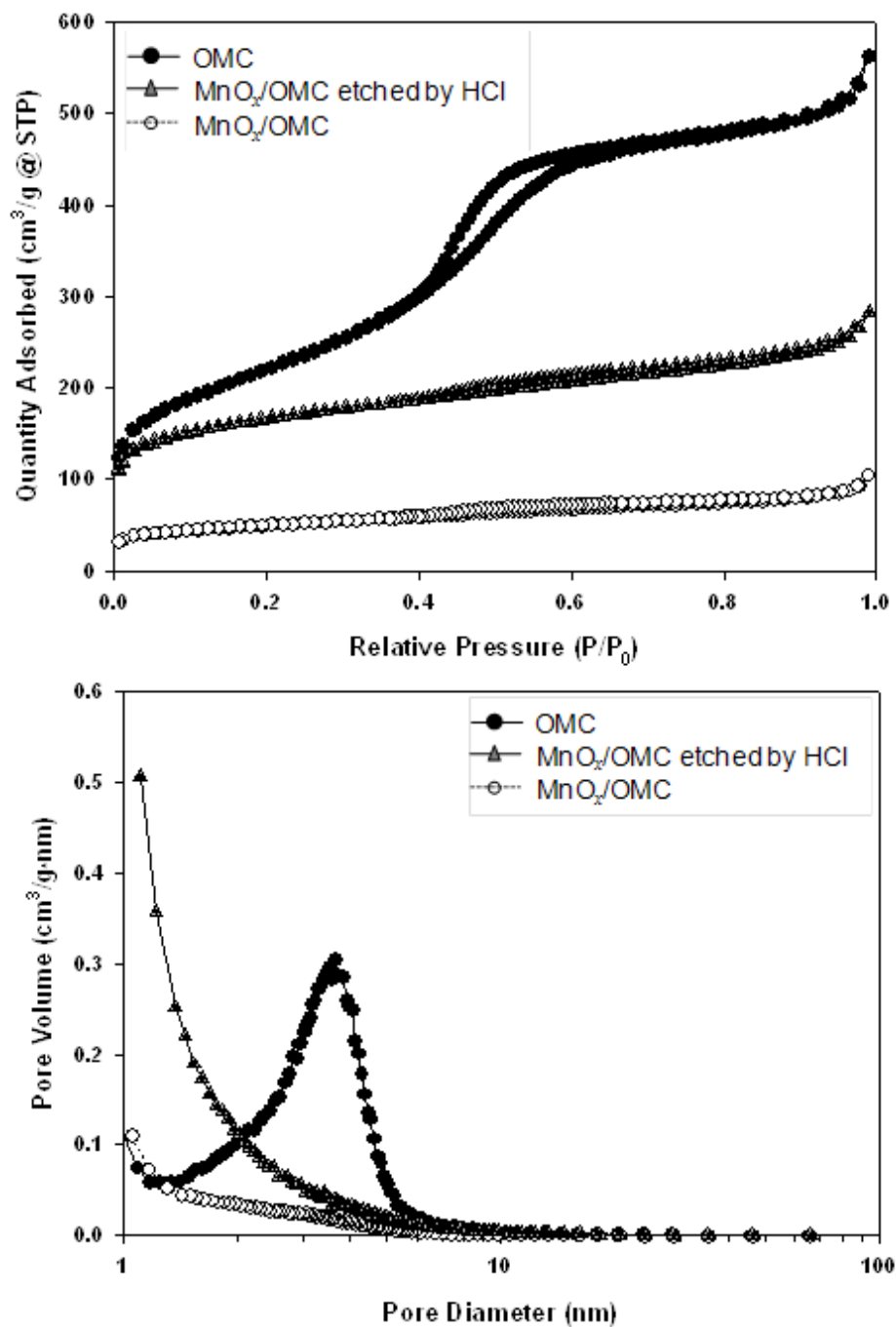


Figure S2. N₂ adsorption/desorption isotherms (top) and BJH pore size distributions (bottom) of OMC, MnO_x/OMC and MnO_x/OMC etched by HCl.

Table S1. BET measurements of OMC, MnO_x/OMC and MnO_x/OMC etched by HCl

	S_{BET} (m ² /g)	V_{TOT} (cm ³ /g)	Pore Size (nm)
OMC	787	0.87	3.7
MnO _x /OMC	178	0.16	n.a.
MnO _x /OMC etched by HCl	591	0.44	n.a.

3. Scanning electron micrographs

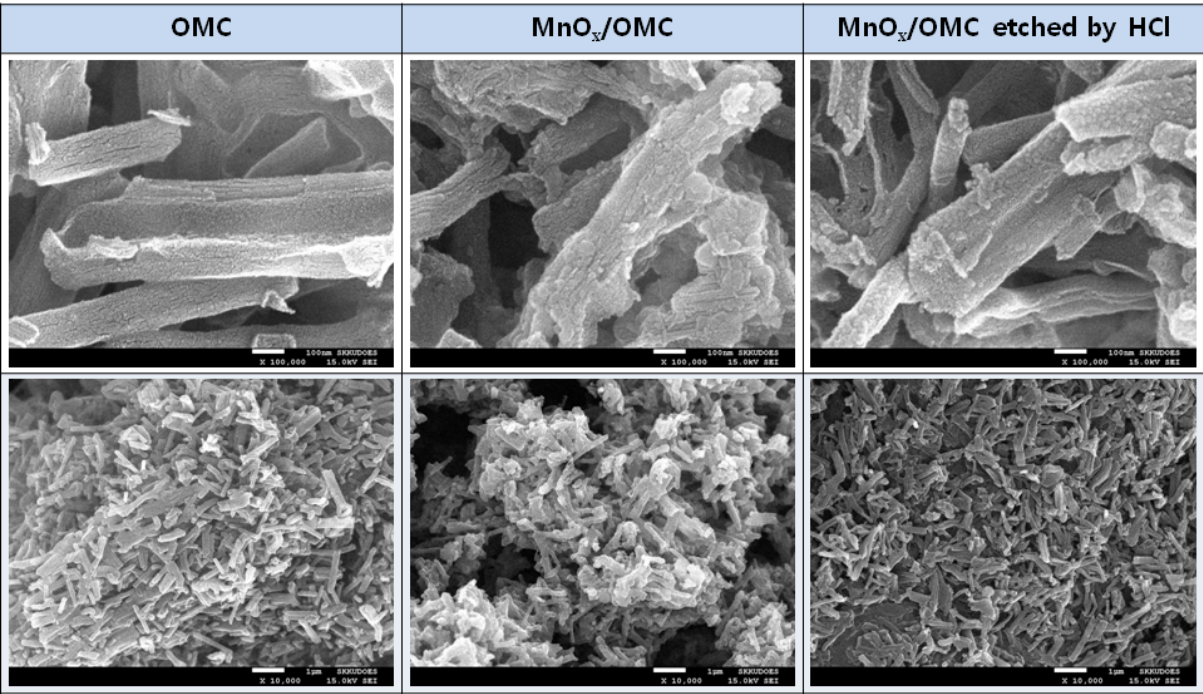


Figure S3. SEM images of OMC, MnO_x/OMC and MnO_x/OMC etched by HCl.

4. Voltage profiles of graphite

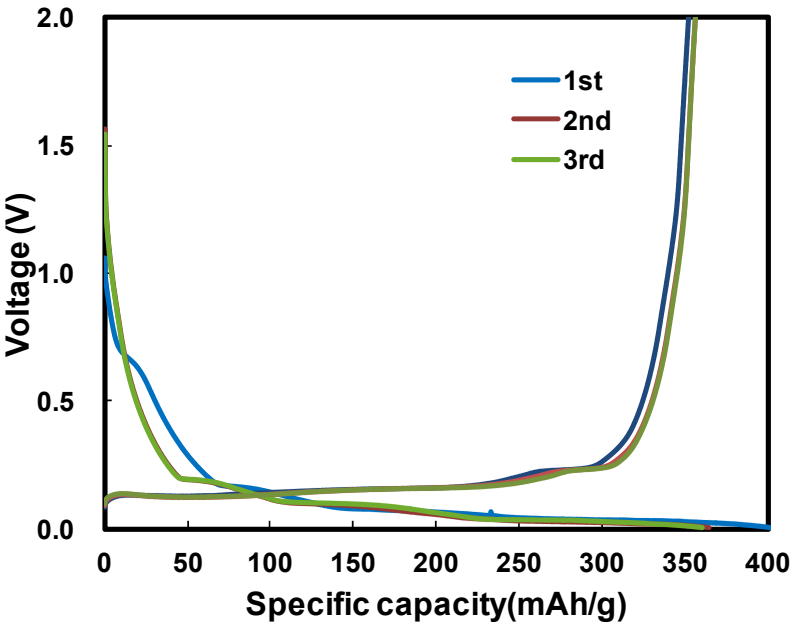


Figure S4. Discharge/charge voltage profiles of graphite for the initial three cycles (cycled between 0.005 – 2.0 V Li⁺/Li at 100 mA/g).

5. Measurement of electrode coating densities

Table S2. Coating densities of electrodes

Electrode	(1) Coating density I (mg/cm ²)	(2) Coating thickness (μm)	(3) Coating density II (g/cm ³)
Graphite	2.39	41.2	0.640
OMC nanorods	1.79	36.3	0.493
Mn ₃ O ₄ /OMC	2.79	37.3	0.676

(1); inclusive of binder and conductive additive,

(2); measured by SEM of electrode cross section shown in Figure S5,

(3) = (1) × (2)

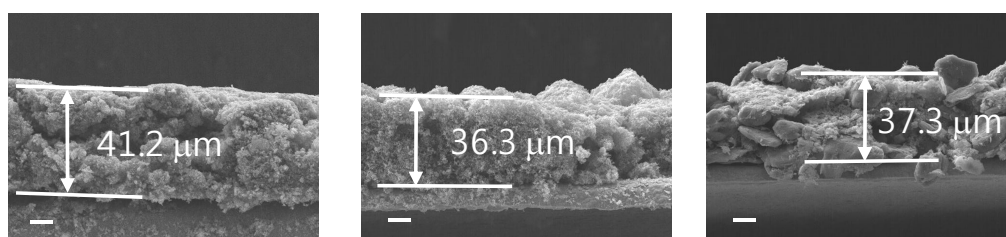


Figure S5. FE-SEM images of electrode cross-sections of (a) Mn₃O₄/OMC, (b) OMC nanorods and (c) graphite. Scale bar is 10 μm.

6. Rate performance of graphite

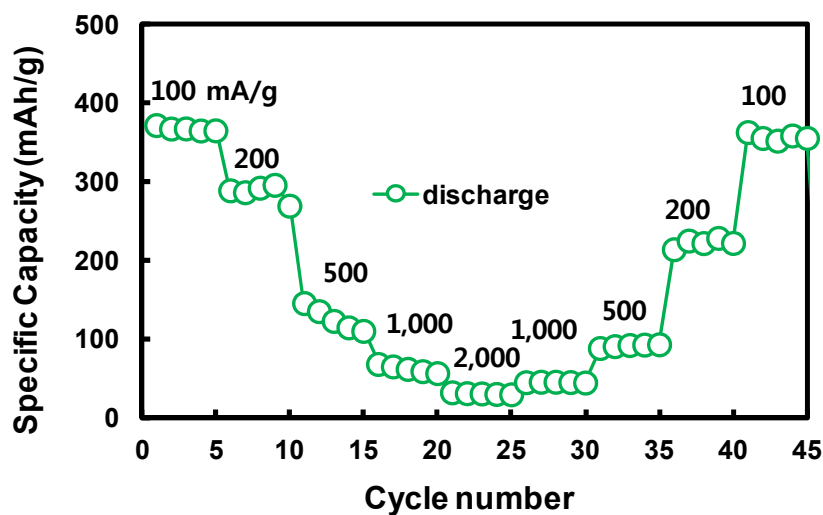


Figure S6. Rate performance of graphite cycled at different currents over 0.005~2.0V Li⁺/Li.