Supporting Information

MoO$_2$@Carbon Hollow Microspheres with Tunable Interiors and Improved Lithium-ion Battery Anode Properties

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Figure S1. XRD pattern of MoO₃ microbelts (the standard data for orthorhombic MoO₃ (JCPDS card 05-0508) is presented at the bottom for comparison).
Figure S2. (a) SEM image of bulk MoO$_3$; (b, c) SEM images of MoO$_2$-AMS; (d, e) SEM and TEM images of MoO$_3$ microbelts; (f) SEM image of MoO$_2$ hollow quasi-microspheres when no NaOH aqueous solution was added.
Figure S3. TEM image of MoO$_2$@C-HMS with a high magnification.
Scheme S1. The possible formation mechanism of MoO$_2$-HMS.
Scheme S2. An illustration for the lithiation and delithiation processes of MoO$_2$@C-HMS and MoO$_2$ solid sphere.
Figure S4. Coulombic efficiency of MoO$_2$@C-HMS electrode at a current density of 100 mA·g$^{-1}$. 
Figure S5. Discharge curves of MoO$_2$@C-HMS at the 6th, 10th, 14th, 18th, 22th and 26th cycle, respectively.
In order to understand the influence of carbon coating on the charge-transfer impedance of electrode, electrochemical impedance tests were performed from $10^5$ Hz to 0.001 Hz. Both Nyquist plots consist of one semicircle at high frequencies and a straight line at low frequencies. Nyquist plots show that the semicircle for MoO$_2$@C-HMS electrode in the high frequency region was much smaller than that of MoO$_2$-HMS electrode, suggesting that the MoO$_2$@C-HMS electrode possesses lower charge-transfer impedance.