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Supporting Information

MnCo₂O₄ Decorated Magnéli Phase Titanium Oxide as a Carbon-Free Cathode for Li-O₂ Batteries

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The determination of weight ratio of MCO to Ti₄O₇ for Ti₄O₇/MCO:

Because Ti₄O₇ is very hard to dissolve in acid media, the Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES) can not be directly used to determine the weight ratio of MCO and Ti₄O₇. Therefore, we have designed an experiment to ensure the precise weight ratio of MCO and Ti₄O₇ for Ti₄O₇/MCO hybrid sample to be obtained. Firstly, 0.0153g of Ti₄O₇/MCO hybrid was dispersed in 20 mL of 1M H₂SO₄ solution and stirred for 10 h. In this process, MCO dissolved in acidic solution while Ti₄O₇ remained as checked by ICP-OES. This process was repeated several times to ensure that MCO dissolved in acidic solution completely by being checked by the ICP-OES. Then the centrifugation and washing were taken to separate Ti₄O₇ from the solution. After freeze-drying, the weight of Ti₄O₇ was 0.0123g. So, the weight ratio of MCO is w(MCO%) = (0.0153 - 0.0123) / 0.0153 = 19.6 wt.%, the weight ratio of Ti₄O₇ is w(MCO%) = 0.0123 / 0.0153 = 80.4 wt%.



Figure S1. SEM image of Ti_4O_7 (2)SiO₂ after H₂ reduction process.



Figure S2. SEM image of Ti_4O_7 particles synthesized without the protection of SiO_2 .



Figure S3. SEM elemental mapping of Ti₄O₇/MCO hybrid.



Figure S4. Cycling performance of C+MCO electrode.



Figure S5. (a) Raman spectra of the pristine (black), discharged (red) and recharged (blue) Ti_4O_7/MCO cathode. (b) The enlarged Raman spectrum of Ti_4O_7/MCO cathode in the black box of (a)