Supporting Information

High Power Lithium-ion Battery based on LiMn$_2$O$_4$-nanorods
Cathode and Carbon-coated Li$_4$Ti$_5$O$_{12}$-nanowires Anode

Xiuli Su, Jingyuan Liu, Congcong Zhang, Tao Huang, Yonggang Wang, Aishui Yu*

Department of Chemistry and Shanghai Key Laboratory of Molecular Catalysis and Innovative Materials, Institute of New Energy, iChEM (Collaborative Innovation Center of Chemistry for Energy Materials), Fudan University, Shanghai 200433, China.
*Corresponding author. E-mail: asyu@fudan.edu.cn
Experimental Section

Preparation of Micro-sized LMO (Li1.1Mn2O4): LMO sample was also synthesized by solid-state method. Stoichiometric amount of Li₂CO₃ and MnO₂ were mixed together and reacted at 530 °C for 5 h, followed by heating at 850 °C for 24 h in air and then the sample was cooled over a six-hour period. The contents of Li and Mn in the as-prepared LMO product was analyzed by inductively coupled plasma (ICP) technology. The result shows that the molar ratios of Li and Mn is about 1.07: 2. The slight loss of Li could be attributable to the Li-salt evaporation over heat treatment process. XRD pattern and SEM image of as-prepared LMO is given in Fig. S1 and Fig. S2, respectively.

Preparation of Micro-sized Li₄Ti₅O₁₂: In typical synthesis, LTO sample was prepared by reacting stoichiometric amounts of Li₂CO₃ and TiO₂ (Anatase) at 800 °C for 10 hours with air atmosphere. XRD pattern and SEM image of as-prepared LTO is given in Fig. S3 and Fig. S4, respectively.
Fig. S1 XRD pattern of as-prepared LMO sample.

Fig. S2 SEM image of as-prepared LMO sample.
Fig. S3 XRD pattern of as-prepared LTO sample.

Fig. S4 SEM image of as-prepared LMO sample.
Fig. S5 TEM image of LMO-nanorods after cycling test.

[In this experiment, the cycled LMO-nanorods electrode was washed with dimethyl carbonate (DMC) in glove-box full with Ar atmosphere. Then, the film electrode (LMO + carbon additive + binder) was removed from the current collector (i.e. Cu foil), which was dispersed in DMC for TEM test.]
Fig. S6 TEM image of carbon coated LTO-nanowires after cycling test.

[In this experiment, the cycled LTO-nanowires electrode was washed with dimethyl carbonate (DMC) in glove-box full with Ar atmosphere. Then, the film electrode (LTO + carbon additive + binder) was removed from the current collector (i.e. Cu foil), which was dispersed in DMC for TEM test.]