

Heterogeneous Synthesis and Electrochemical Performance of LiMnPO₄/C Composites as Cathode Materials for Lithium Ion Batteries

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Supporting Information I

The electrode slurry was developed by mixing LiMnPO₄ or LiMnPO₄/C, super P carbon black and polyvinylidene fluoride binder (Solef) at a weight ratio of 75:10:15 in N-methyl-2-pyrrolidone (NMP). The acquired slurry was uniformly cast onto aluminum foil, and dried at 120 °C in a vacuum oven to yield the working electrode. CR2032- type coin cells composed of a working electrode, a Li foil counter electrode, a Celgard 2300 membrane separator and an electrolyte (1 mol L⁻¹ LiPF₆ in ethylene carbonate (EC) and dimethyl carbonate (DMC) (v/v = 1:1) were prepared in a Ar-filled glove box (MBRAUN, Germany).

Supporting Information II

As show in figure S1, the curves show weight loss process consists of three stages. The first stage is from room temperature to about 200 °C. The second stage appears from 200 °C to 400 °C. The second stage appears from 400 °C to 600 °C. The third stage shows endothermic peak around 500 °C, which is corresponding to the formation of the crystalline phase of LiMnPO₄^{1, 2}. There is almost no weight loss when the temperature was above 600 °C, which indicated the crystallization

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for the LiMnPO_4 composite materials.

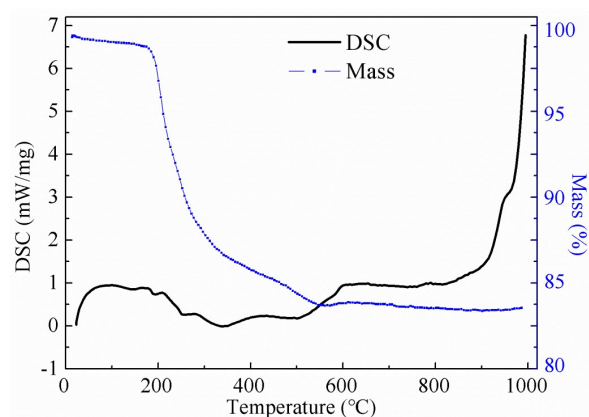


Figure S1 TG-DSC curves of the precursor

Supporting Information III

FT-IR absorption spectra of the as-synthesized samples are shown in figure S2. PO_4 groups revealed by characteristic absorption peaks at 546.5 cm^{-1} due to P-O bending vibration and 636, 976.6 and 1089.5 cm^{-1} owing to P-O stretching vibration. Characteristic absorption peaks at 1738.6 cm^{-1} was attributable to the benzene ring stretching vibration. All complexes characteristic absorptions present a broad band at ca. $2500\text{--}3500\text{ cm}^{-1}$, the broad band centered at 3000 cm^{-1} was assigned to the C-H group and disappeared in calcined product owing to deprotonation^{3,4}.

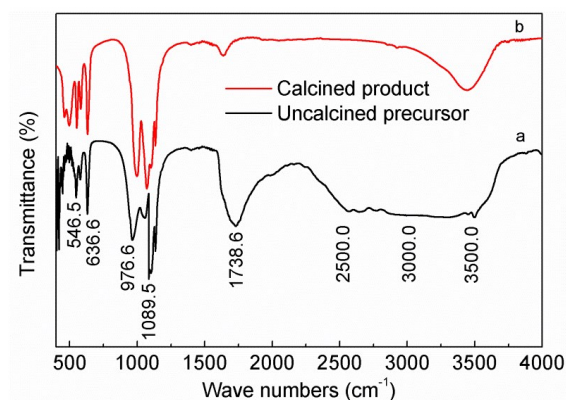


Figure S2 FT-IR absorption spectra of the samples prepared via homogeneous nucleation. (a) FT-IR absorption spectrum of the precursor achieved by the hydrothermal reaction, (b) FT-IR absorption spectrum of the product obtained from calcined precursor sample.

References

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