Supporting data

**Fig. S1** SEM images of the Li$_3$PO$_4$ precursors collected under different volume ratio of PEG600 to H$_2$O (R = V$_{PEG600}$/V$_{H2O}$).

**Fig. S2** HRTEM images of the sample prepared at room temperature by mixing LiOH and H$_3$PO$_4$ solution in PEG600, then MnSO$_4$·H$_2$O solution was added: a) Li$_3$PO$_4$ nanoparticles, b) sheet-like manganese phosphate hydrates.
**Fig. S3** TEM images of the LMP products which were obtained by mixing LiOH and H₃PO₄ solution in PEG600, then MnSO₄·H₂O solution was added, the mixture was solvothermally treated at 180 °C for different time: (a) 2 h, (b) 4 h, (c) 8 h, (d) 16 h without addition of ammonia.

![TEM images](image)

**Fig. S4** XRD patterns of the LMP products which were obtained by mixing LiOH and H₃PO₄ solution in PEG600, then MnSO₄·H₂O solution was added, the mixture was solvothermally treated at 180 °C for different time: (a) 2 h, (b) 4 h, (c) 8 h, (d) 16 h without addition of ammonia.

![XRD patterns](image)

**Fig. S5** TEM images of the LMP products collected at: (a) pH value of 4.99 and (b) pH value of 8.35.

![TEM images](image)
**Fig. S6** XRD patterns of the LMP products collected under different pH value.

**Fig. S7** Linear fit of $I_p = k \cdot v^{1/2}$ obtained form the CV curves of the LMP products collected under different pH value: (a) 4.99, (b) 6.46.