RSC Advance

PAPER

Supporting information for

# Solvothermal synthesis and self-assembling mechanism of micro-nano spherical $LiFePO_4$ with high tap density

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## Characterization of products

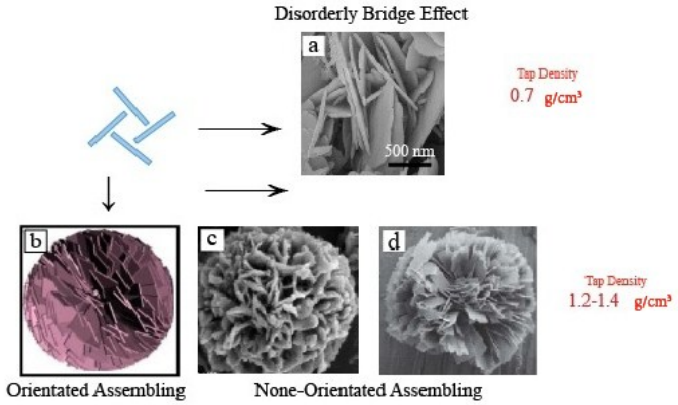


Fig.1a reference from Electrochimica Acta, 2010, 56(2): 995-999.
Fig.1c reference from J.Am.Chem.Soc.2011,133,2132-2135.
Fig.1d reference from CrystEngComm,2012,14,4284-4288.

Fig.S1. Schematic illustration of the nanosheet and the micro-nano spherical $LiFePO_4$

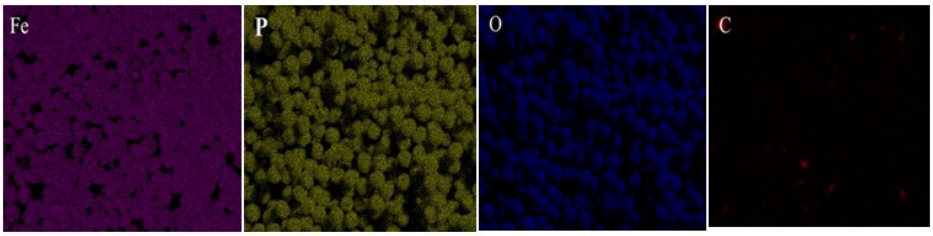


Fig. S2 EDS analysis of the $LiFePO_4$ microsphere

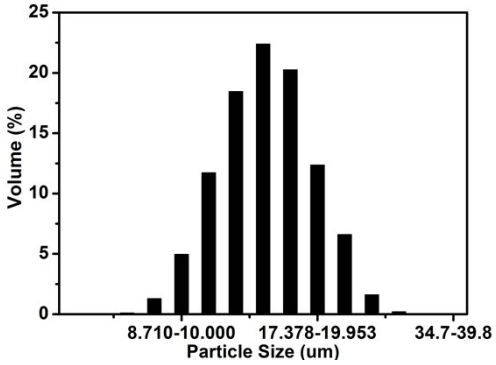


Fig. S3 Particle size distribution of $LiFePO_4$ microsphere.

As shown in Fig. S3, it is clear that the sample consists of uniform and monodisperse microsphere with the diameter of about 15μm.

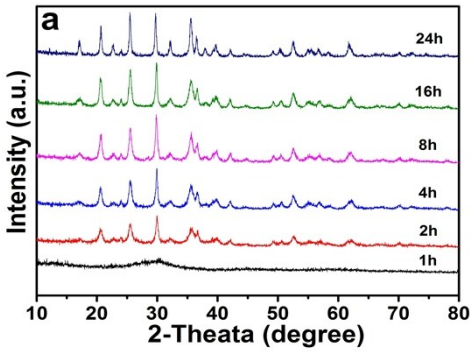


Fig. S4 XRD patterns of the $LiFePO_4$ microsphere prepared at different solvothermal time

XRD patterns of the $LiFePO_4$ microsphere prepared at different reaction time are shown in Fig. S4. When the reaction time was 1 h and 2 h, no obvious diffraction peak was observed and the sample was still in the amorphous state. As the reaction proceeded, the crystallity of the sample increased significantly. After 24 h, $LiFePO_4$ crystal with high degree of crystallinity was obtained.

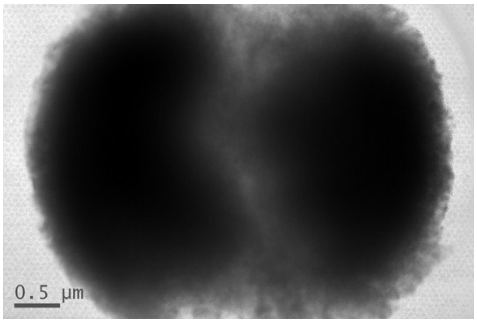


Fig.S5 TEM image of the saddle-shaped structure

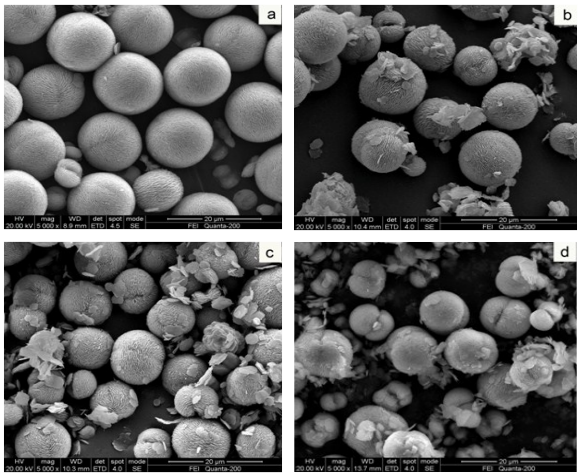


Fig. S6 SEM images of samples prepared with glycol solvent containing different content of deionized water (a) 0%; (b) 3%;( c) 5%; (d),10%

As shown in Fig. S6, the more water content in solvent, the more fragments of non-orientated assembling nanosheets.

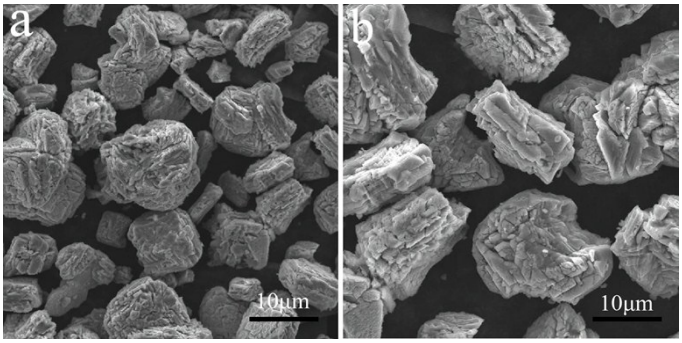


Fig.S7 SEM images of samples with deionized water as solvent

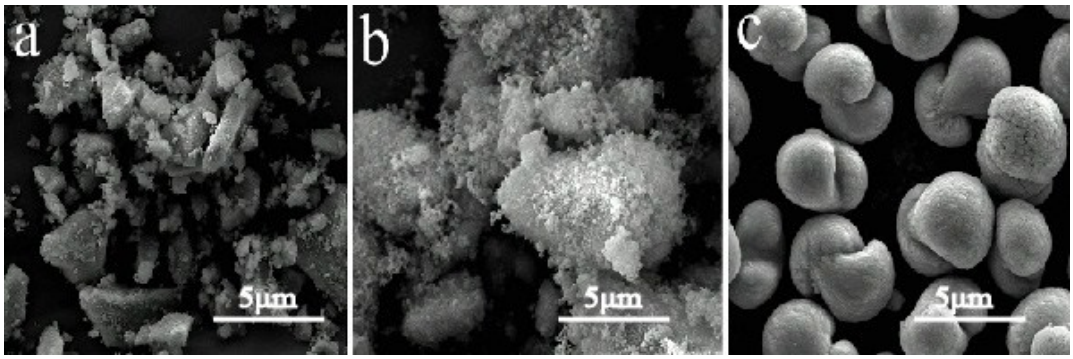


Fig. S8 SEM images of samples with diethylene glycol (a), 1,2-propylene glycol (b), isopropanol (c) as solvent

When the solvent was transformed to deionized water, diethylene glycol, 1,2-propylene glycol, isopropanol, the products obtained were not the micro-nano structure $LiFePO_4$.