Supplementary File

Mediating Lithium Plating/Stripping by Constructing 3D Au@Cu Pentagonal Pyramid Array

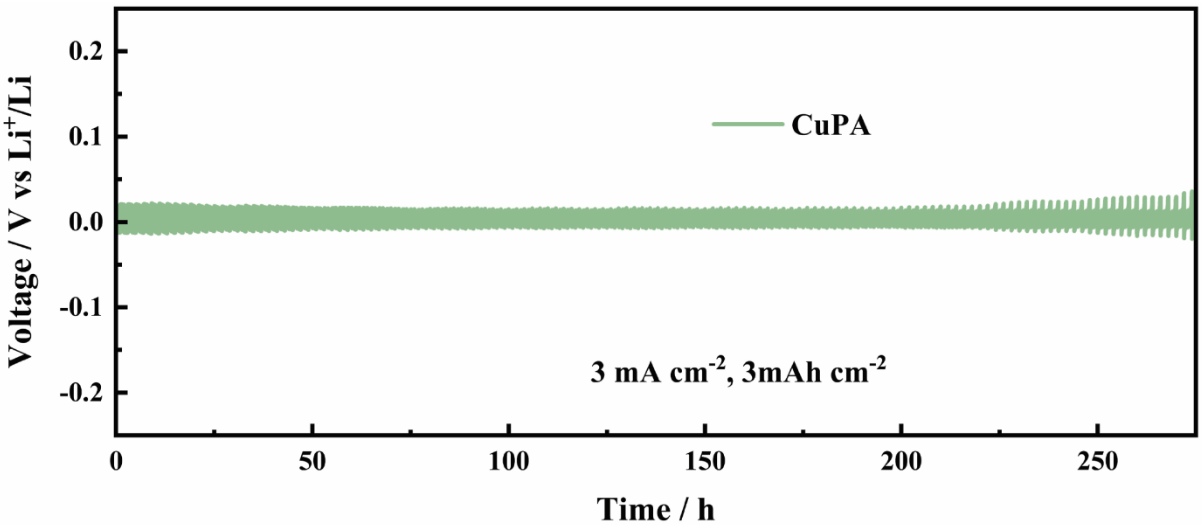

Figure S1. Voltage–time curves of CuPA in symmetric cells under 3 mA cm^{-2}, 3 mAh cm^{-2}. The CuPA-based electrode exhibits a stable cycle of 275 h at 3 mAh cm^{-2}, 3 mA cm^{-2}.

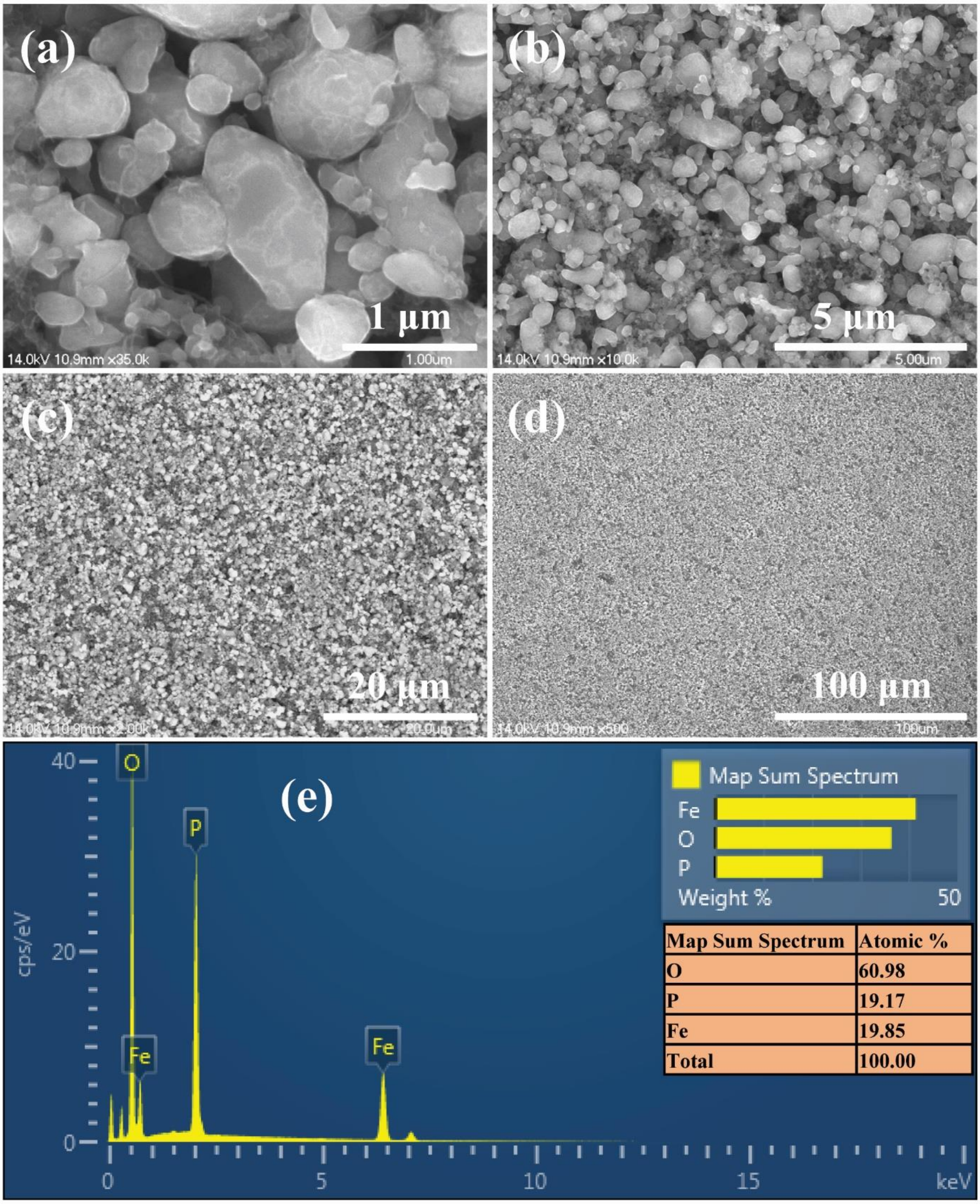

Figure S2. The SEM images (a–d) and EDX spectrum (e) of the $LiFePO_4$ electrode under different magnifications.

Table S1. Comparison of electrochemical performances of different LMAs in full cells with LFP

Anodes	Mass load (mg cm^{-2})	N/P ratio (anode : cathode)	Cycle number (n)	Ref.
Ni nano-cone @ Al	1.4	8.4	110	[1]
MXene @ Au host	1	29	200	[2]
CuO nanowire arrays/Cu	2	5.8	150	[3]
Cu(f) @ Sb	3	7.85	160	[4]
Cu nanowire @ poly (1,3,5-triethynylbenzene) (PTEB) nanofiber	2	14.7	100	[5]
CuO nanofilm-covered Cu microcones @ Cu foil	1.3	9	100	[6]
Au@CuPPA (This work)	3	5.8	150	

The mass loading of the LPF cathode and the N:P ratio affect the electrochemical performance of the full cells. Generally speaking, an excessively large N:P ratio means that the capacity of the anode is too large, which may lead to good electrochemical performance but is contrary to industry standards (the N:P ratio of commercial batteries is generally about 1.06–1.10). In this manuscript, we used LPF with a mass loading of 3 mg cm^{-2} (capacity density of 0.51 mAh g-1) as a cathode. The N:P ratio is 5:8 in this work, which is very relatively close to the industry standard compared to previous publications, as shown in Table S1. Meanwhile, the proposed anode exhibits relatively good cycling performance at the lowest N:P ratio.

Reference:

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[6] Hu W., Yao Y., Huang X., Ju S., Chen Z., Li M., Wu Y. CuO Nanofilm–Covered Cu Microcone Coating for a Long Cycle Li Metal Anode by In Situ Formed Li2O ACS Applied Energy Materials 5 (3) 2022: pp. 3773–3782. https://doi.org/10.1021/acsaem.2c00218