

## Supplementary Information

# A Layer-Built Rechargeable Lithium Ribbon-Type Battery for High Energy Density Textile Battery

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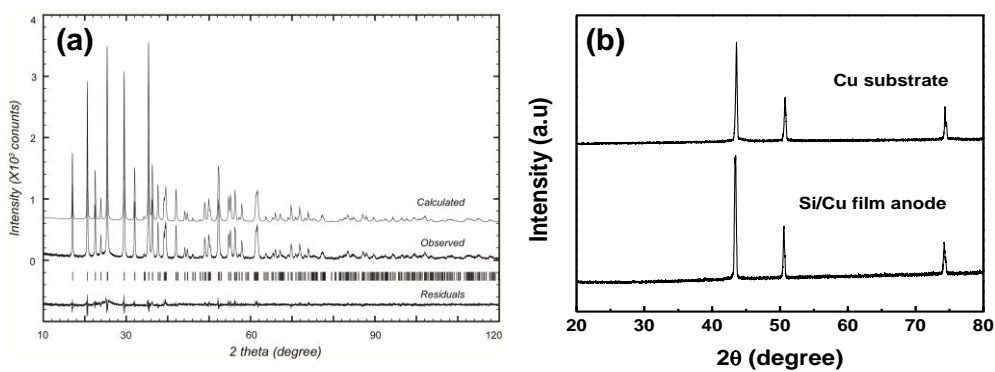
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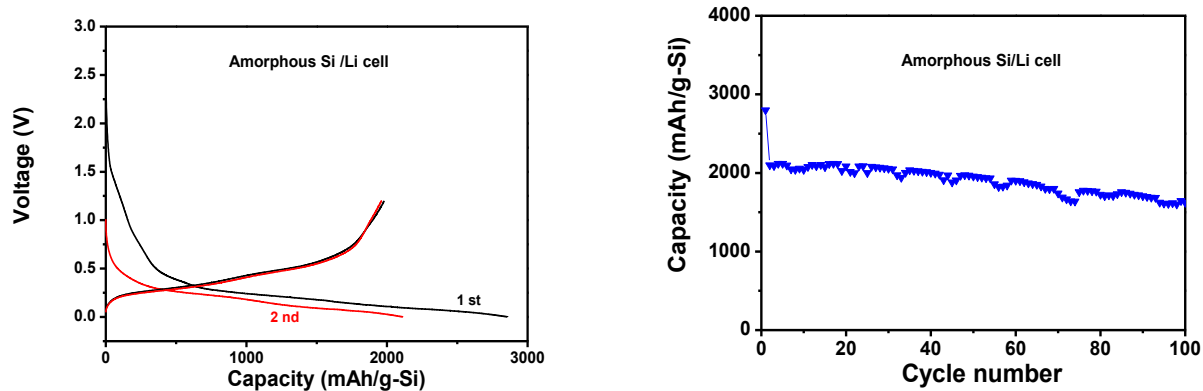
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**Figure S1.** 1 mm wide, 10 cm long and 1 mm thickness wire battery.



**Figure S2.** X-ray diffraction pattern and Rietveld refined results of a)  $\text{LiFePO}_4$  and b) the amorphous silicon film.



**Figure S3.** Charge–discharge curves at the first and second cycles (left), and cycling performance, of the amorphous Si/Li batteries at 0.5 C (RT).

Table S1: Rietveld refinement results for  $\text{LiFePO}_4$ .

Sample code	$\text{LiFePO}_4/\text{S}$	
Li	x	0
	y	0
	z	0
Fe	x	0.2817(1)
	y	0.25
	z	0.9330(4)
P	x	0.0949(3)
	y	0.25

	z	0.4206(6)
O1	x	0.0930(7)
	y	0.25
	z	0.741(1)
O2	x	0.4547(7)
	y	0.25
	z	0.209(1)
O3	x	0.1645(5)
	y	0.0507(7)
	z	0.2832(7)

Table S2. The bond angles and bond distances in LiO<sub>6</sub>, FeO<sub>6</sub> and PO<sub>4</sub> polyhedra.

Sample code		LFP/S
Distances	( Li )-( O1 ) x 2	2.157(5)
	( Li )-( O2 ) x 2	2.082(3)
	( Li )-( O3 ) x 2	2.178(5)
Li	( O1 )-( Li )-( O2 ) x 2	88.2(3)
	( O1 )-( Li )-( O2 ) x 2	91.82(17)
	( O1 )-( Li )-( O3 ) x 2	84.3(3)
	( O1 )-( Li )-( O3 ) x 2	95.7(4)
	( O2 )-( Li )-( O3 ) x 2	70.9(3)
	( O2 )-( Li )-( O3 ) x 2	109.1(3)

Sample code		LFP/S
	( Fe )-( O1 )	2.229(8)
	( Fe )-( O2 )	2.101(7)
	( Fe )-( O3 ) x 2	2.238(5)
	( Fe )-( O3 ) x 2	2.088(5)
	( O1 )-( Fe )-( O2 )	177.4(6)
	( O1 )-( Fe )-( O3 ) x 2	81.2(3)
<b>Fe</b>	( O1 )-( Fe )-( O3 ) x 2	91.3(4)
	( O2 )-( Fe )-( O3 ) x 2	96.6(4)
	( O2 )-( Fe )-( O3 ) x 2	90.0(3)
	( O3 )-( Fe )-( O3 ) x 2	87.6(3)
	( O3 )-( Fe )-( O3 ) x 2	152.0(4)
	( O3 )-( Fe )-( O3 )	64.6(3)
	( O3 )-( Fe )-( O3 )	119.7(4)
Sample code		LFP/S
	( P )-( O1 )	1.504(5)
	( P )-( O2 )	1.568(8)
<b>P</b>	( P )-( O3 ) x 2	1.537(5)
	( O1 )-( P )-( O2 )	112.1(6)
	( O1 )-( P )-( O3 ) x 2	115.2(5)
	( O2 )-( P )-( O3 ) x 2	105.5(6)
	( O3 )-( P )-( O3 )	102.1(5)