Supporting Information

Nitrogen-Doped-Carbon/ZnO Modified Cu Foam Current Collector for High-Performance Li Metal Batteries

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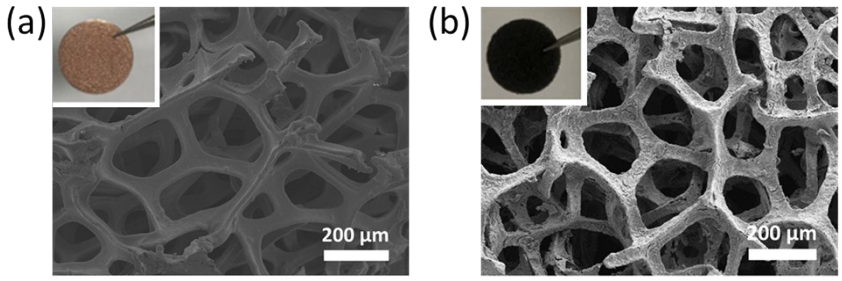

Fig. S1 The low-magnification SEM images of a) CuF and b) MCuF (insets are the corresponding optical photographs).

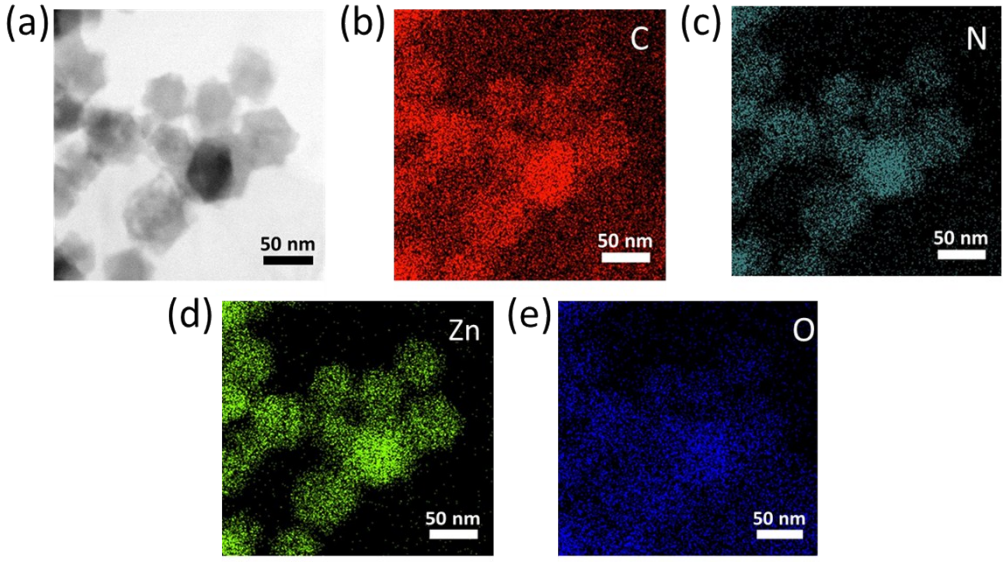

Fig. S2 a) The TEM image of ZIF-8-600 and the corresponding EDS mapping results of b) carbon, c) nitrogen, d) zinc and e) oxygen.

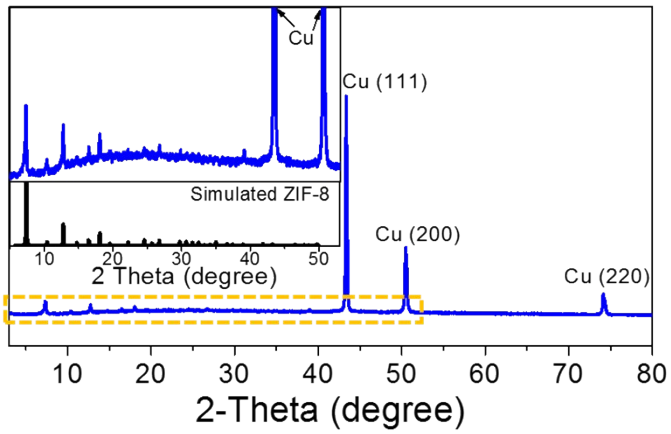

Fig. S3 The XRD pattern of CuF/ZIF-8 (inset is the magnification of the selected area).

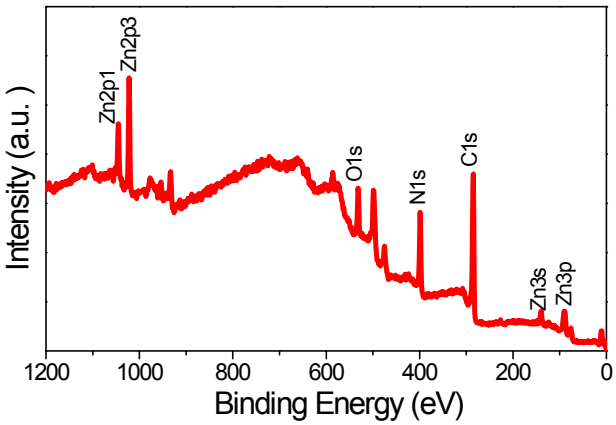

Fig. S4 The XPS survey spectrum of MCuF.

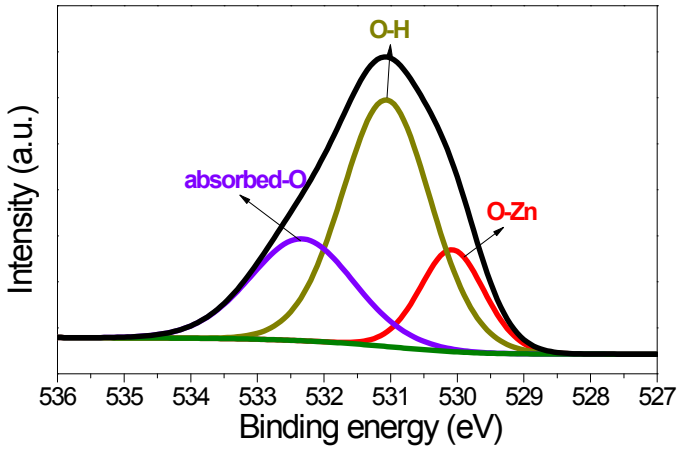

Fig. S5 O 1s spectrum of MCuF.

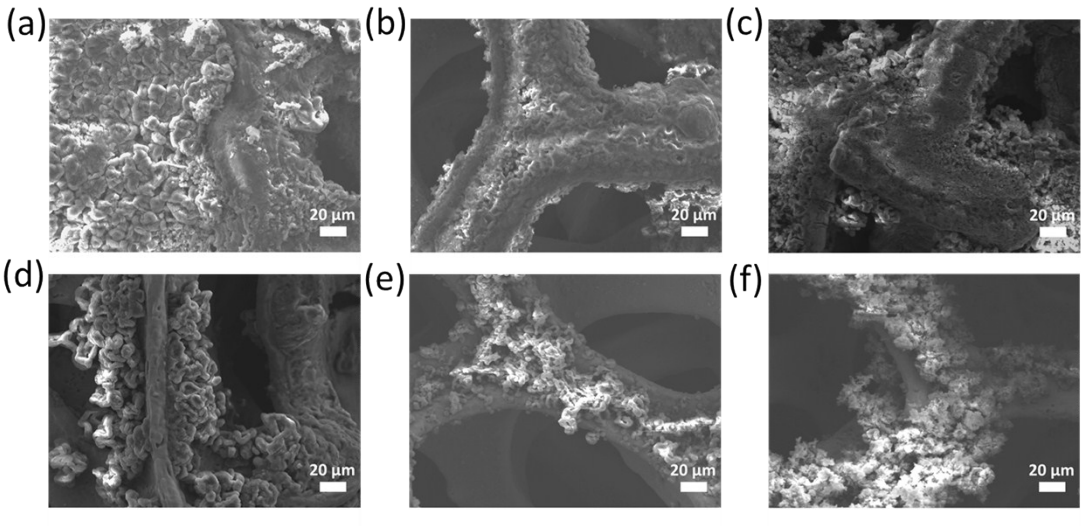

Fig. S6 Top view SEM images of MCuF after the a) 10th plating at 1 mA cm^{-2}. b) 10th plating at 3 mA cm^{-2}. c) 50th plating at 3 mA cm^{-2}. And top view SEM images of CuF after the d) 10th plating at 1 mA cm^{-2}. e) 10th plating at 3 mA cm^{-2}. f) 50th plating at 3 mA cm^{-2}. The area capacity is 1 mA h cm^{-2}.

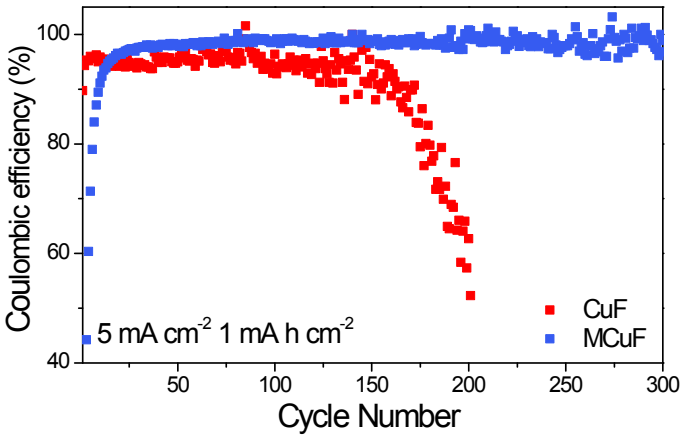

Fig. S7 Coulombic efficiencies of Li plating/stripping on MCuF and CuF with current density of 5 mA cm^{-2} with an area capacity of 1 mA h cm^{-2}.

Table S1. Comparison of the long-term cycling performances and Coulombic efficiencies of MCuF with previously reported Cu-based current collector for Li metal anodes.

References	Materials	Current density (mA cm^{-2})	Area capacity (mA h cm^{-2})	Cycle number	Coulombic efficiency (%)
1	N-doped grapehene coated on 3D Cu	0.5	1	150	97.5
		1	2	50	97
		0.5	2	100	97.6
		0.5	4	100	97.8
2	Zn-Cu chemical dealloy	0.5	1	250	97
		1	1	140	97
3	Zn-Cu electrochemical dealloying	1	1	200	97.9
			2	50	97.6
			5	50	97.1
4	Cu nanowire	1	2	200	98.6
5	Hierarchically bicontinuous porous copper	1	1	270	98
		1.5		200	96
		2		150	95
		3		100	94
6	Vertically aligned 3D Cu	1	3	200	98.5
7	Vertically aligned CuO on Cu collector	0.5	1	After 180	94
		1	1	After 180	94
8	3D Cu skeleton fabricate by NaCl template	0.5	1	700	95
		1	1	400	95
9	Cu mesh	0.5	1	first 70 cycles	97
				after 100cycles	93.8
This work	**MCuF**	**1**	**1**	**600**	97.8
		3	1	400	97.6
		5	1	300	97.3
		10	**1**	**200**	96.5
		3	**3**	**120**	97.2

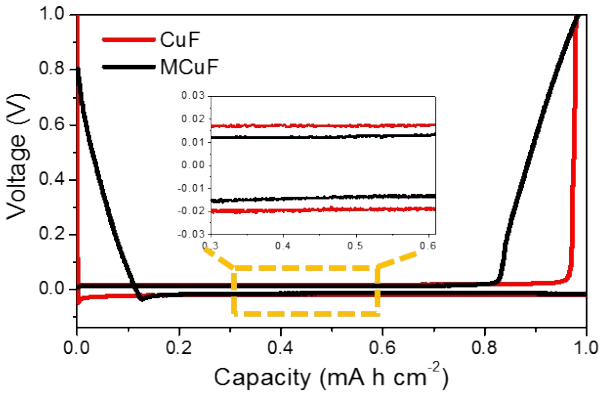

Fig. S8 Voltage profiles of Li plating/stripping on MCuF and CuF at the current density of 1 mA cm^{-2} with an area capacity of 1 mA h cm^{-2}.

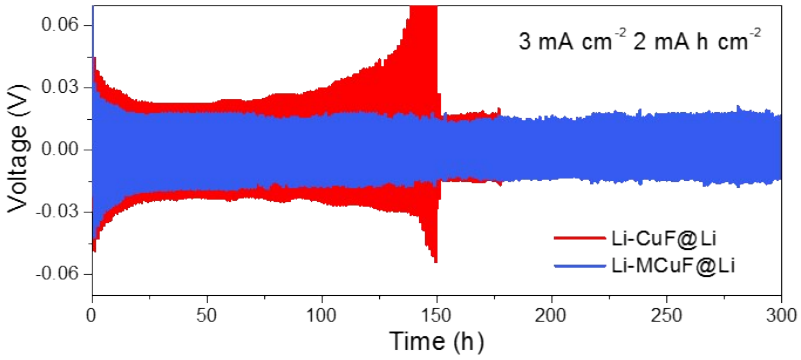

Fig. S9 Voltage-time profiles of MCuF@Li and CuF@Li symmetrical cells at the current density of 3 mA cm^{-2} with an area capacity of 2 mA h cm^{-2}.

References:

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