

Supporting Information

3D hierarchical Cu@Ag nanostructure as a current collector for dendrite-free lithium metal anode

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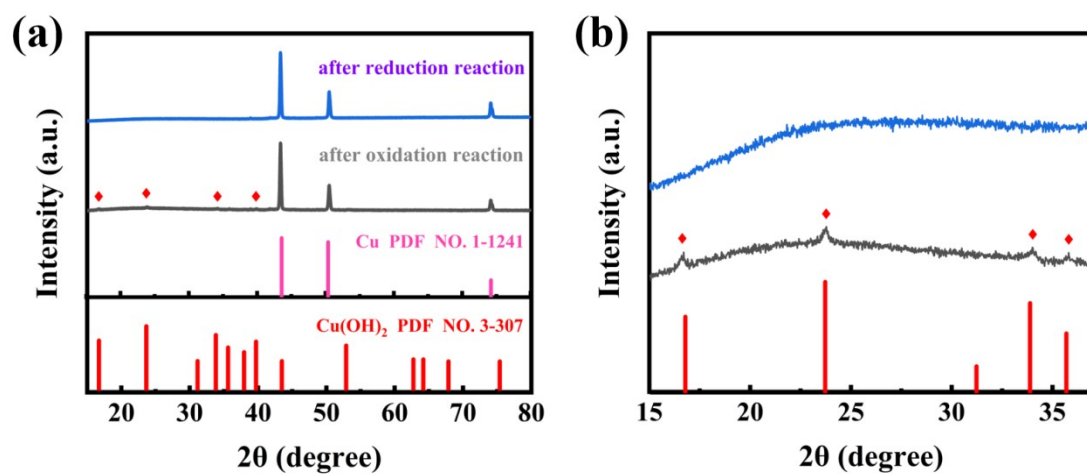


Figure S1. (a) XRD patterns of Cu foam after oxidation reaction and reduction reaction and (b) corresponding enlarged patterns.

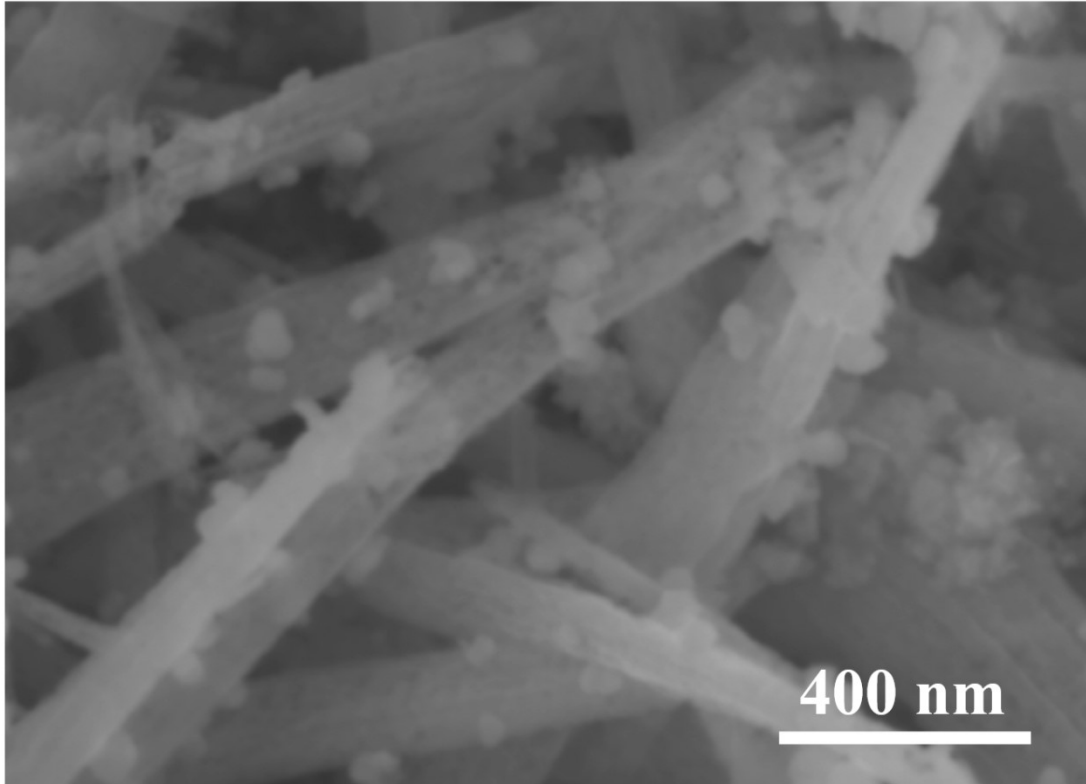


Figure S2. SEM image of Ag nanoparticles on Cu nanowires

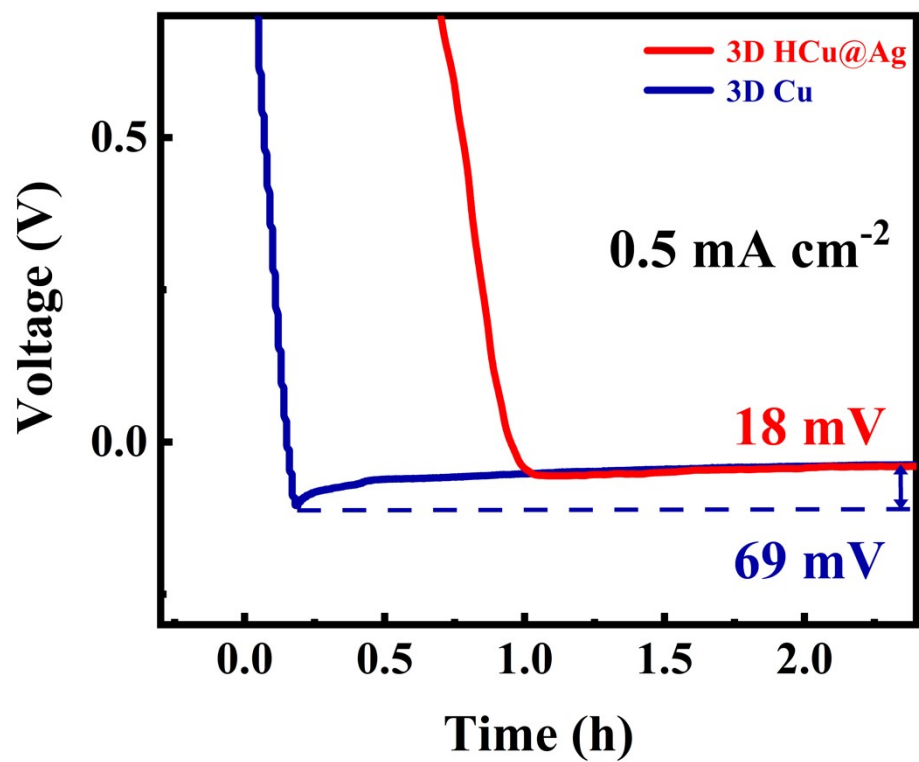


Figure S3. Time-voltage profiles of lithium deposited on the 3D HCu@Ag and 3D Cu at a current density of 0.5 mA cm⁻².

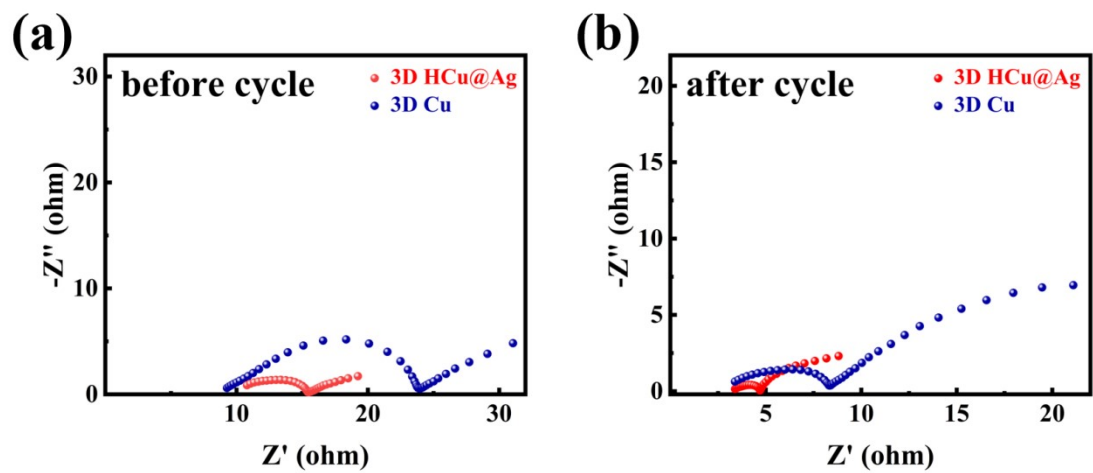


Figure S4 Nyquist plots of the 3D HCu@Ag and 3D Cu symmetrical cells (a) before the cycle and (b) after 50th cycle.

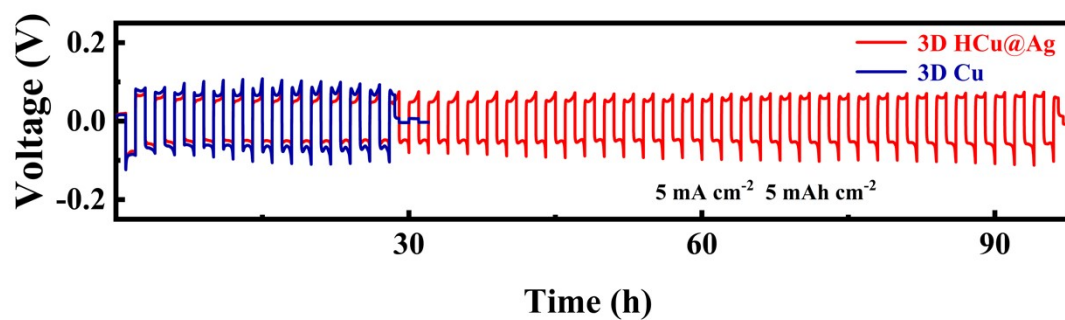


Figure S5. Galvanostatic discharge/charge profiles of the Li-3D HCu@Ag and Li-3D Cu symmetrical cells at 5 mA cm^{-2} with 5 mA h cm^{-2}

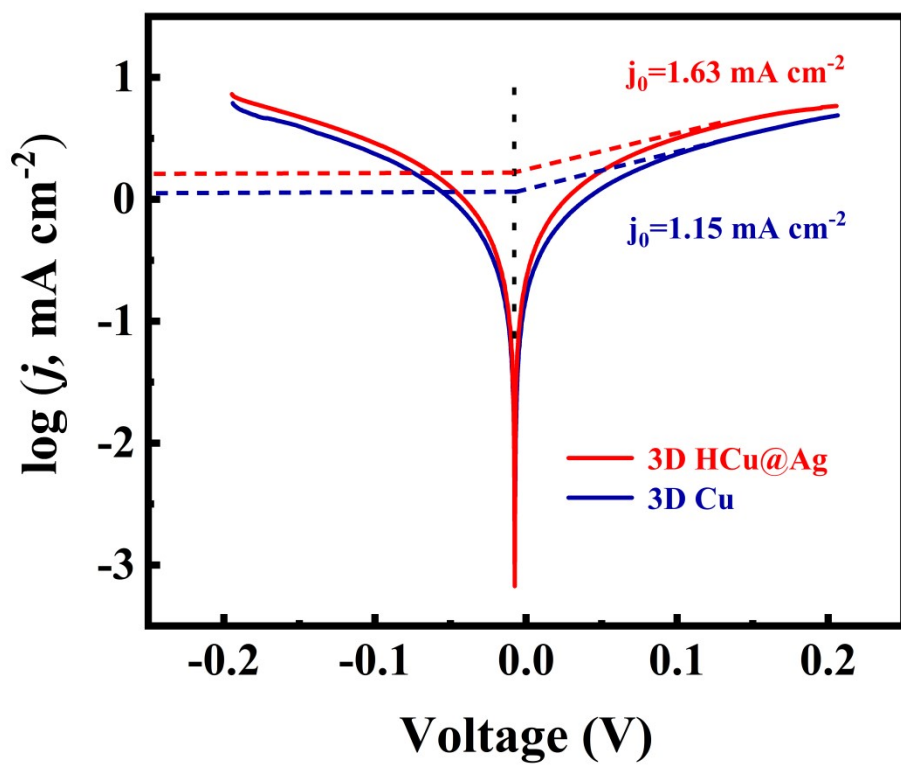


Figure S6. Exchange current density of 3D HCu@Ag and 3D Cu.

Table S1 Comparison of the cycling performance of half-cell between the Li-3D HCu@Ag and reported lithiophilic Cu-based current collectors.

Current Collector	Lithiophilic modifiers	Current density (mA cm ⁻²)	Areal capacity (mAh cm ⁻²)	cycles	Ref.
2h-3D CuZn	CuZn alloy	0.5	1	220	1
		1	1	150	
Li-Cu/CF	Li-Cu alloy	1	1	210	2
Cu@Ag foam	Ag	0.5	2	70	3
Au/Cu nanoscaffold	Au nanoseed	0.5	1	200	4
PDA@3D Cu	polydopamine	0.5	1	200	5
		1	1	150	
		2	1	150	
h-BN@Cu	h-BN	0.5	1	240	6
3D HCu@Ag	Ag	1	1	170	This work
		3	1	70	

Table S2 Comparison of the cycling performance of symmetrical cell between the Li-3D HCu@Ag and reported lithiophilic Cu-based current collectors.

Current Collector	Lithiophilic modifiers	Current density (mA cm ⁻²)	Areal capacity (mAh cm ⁻²)	Time (h)	Ref.
LVCF	ZnO quantum dots, N-containing functional groups	0.5	1	1800	7
		5	1	500	
		3	3	550	
CoO-CF	CoO nanosheets	1	1	600	8
		8	1	150	
TiN@Cu foam	TiN	0.5	1	1900	9
		1	1	1000	
		3	1	200	
ZnO-MCNCF	ZnO layer	1	1	900	10
		3	1	300	
Li/Ag@Cu	Ag	1	1	1000	11

		3	1	600	
		5	1	600	
		3	3	400	
BP@Cu foams	Black Phosphorus	0.5	1	1300	12
		1	1	900	
CAI	Ag	5	1	60	13
3D HCu@Ag	Ag	1	1	1500	This work
		3	3	350	
		5	5	100	

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