Supplementary Information (SI) for Sustainable Energy & Fuels.

Supplementary Information for:

Stable Lithium Plating/Stripping Electrochemistry Promoted by MnO_2 Modified Copper Current Collector for Stable Lithium Metal Anodes

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Note S1. Characterizations

The produced sample's XRD was observed using Cu Kα (λ = 1.5406) radiation by D8 Advance Bruker. Rietveld refinement was performed in the FullProf program using the pseudo-Voigt work function. A ThermoElectron ESCALAB 250 spectrometer was also used to conduct the XPS examination, and Al Kα radiation (1486.6 eV) was used. Using FEI TECNAI G2 20 Twin equipment, high resolution transmission electron microscopy (HRTEM) was used to analyze morphology and structural composition.

Table S1 Comparison of electrochemical performances of modified copper current collectors.

Modification	Cell type	Nucleation overpotential (mV)		Ref.
		Before modification	After modification	
Dealloying method	Cu|Li	79.3	42.6	1
Organic protective layer	Cu@β-PVDF|Li	31–80	33	2
Oxidation method	Cu-CuO|Li	200	25	3
Organic template method	Cu|Li	60	28	4
Alloying method	Cu-Zn|Li	>40	18	5
	Cu-Zn|Li	~205	~75	6
Spot modification	Cu@ZnO|Li	~168	~56.4	7
	Cu@Ag|Li	67.9	47.1	8
Inorganic-organic protective layer	Cu@LLN|Li	65–84	45–90	9
	Cu@NDC/ZnO|Li	38	27	10
	Cu@LiF-Pan400|LFP	–	–	11
Inorganic protective layer	Cu@AlN_3|LFP	~222	~146	12
	Cu@C|LFP	~210	~50	13
	Cu@LTO/Zn/Zn@Li	~21	~16	14

	$Cu@Cu_3N$|LFP	–	–	15
	Cu@Li|Li	~70	20	16
	$Cu@\alpha\text{-}Si_3N_4$|Li	–	–	17
	Cu@CNF|Li	~77	~27	18
	$Cu@Li_2S$|Li	70.2	12.5	19
	$Cu@g\text{-}C_3N_4$|Li	92	~20	20
	Cu@GN|Li	–	–	21
	$Cu@Ag\text{-}A_2O_3$|Li	100	~0	22
	Cu@AZO|LFP	>500	110	23
	$Cu@MnO_2$|Li	101	19	Our work

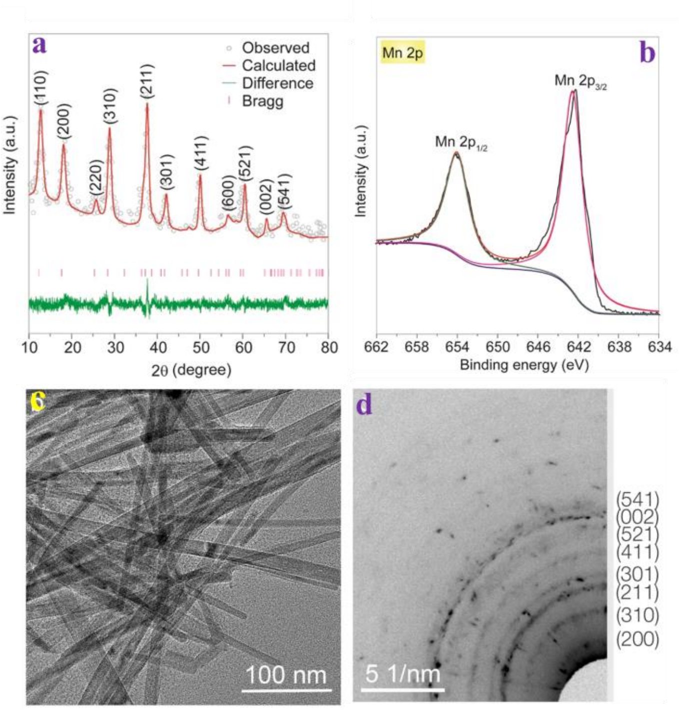

Fig. S1. (a) XRD spectrum, (b) XPS spectra deconvolution of core level spectra for Mn 2*p*, (c) HRTEM image, (d) SAED pattern of MnO_2 sample. [Reproduced from ref 24. Available under a CC-BY license. Copyright 2021, Bidhan Pandit et al./American Chemical Society.]

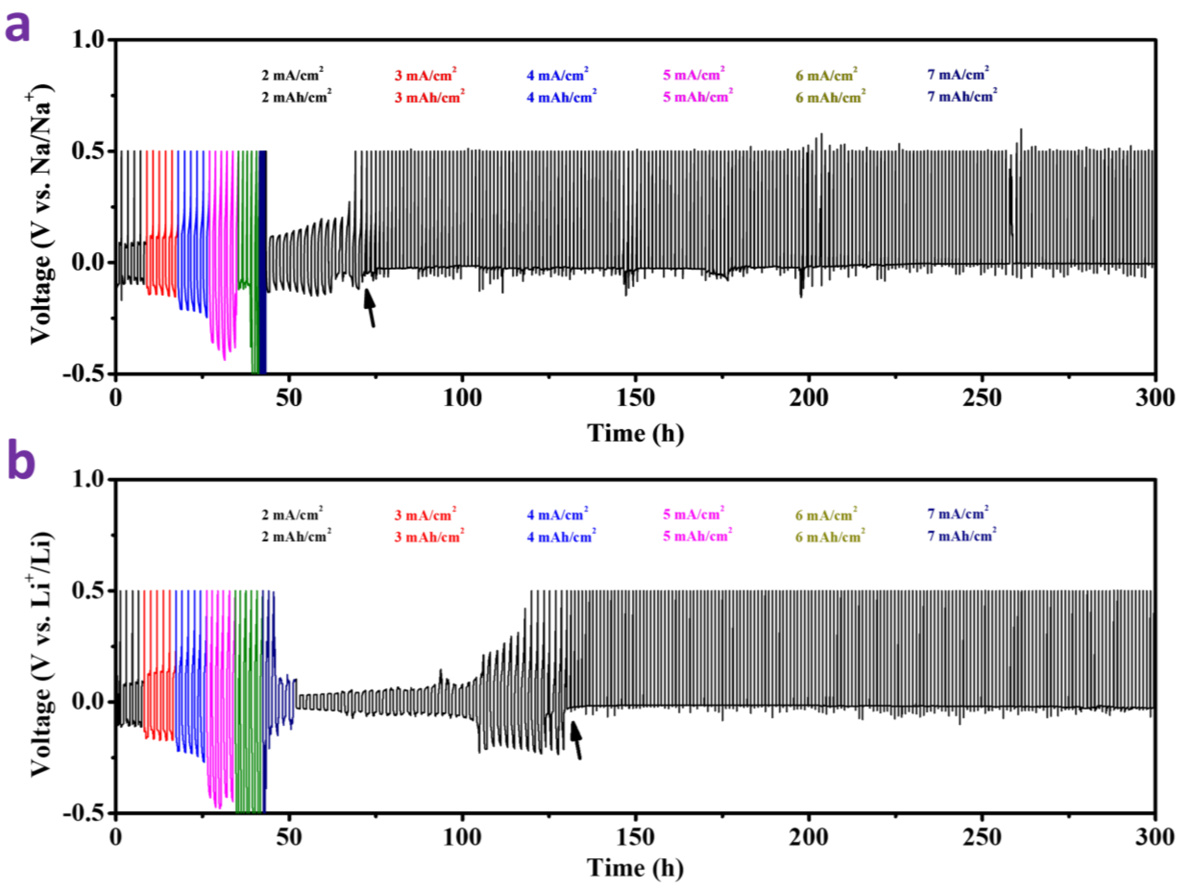

Fig. S2. Rate performance of lithium plating/stripping on (a) bare Cu and (b) MnO_2@Cu at the current density 2-7 mA/cm^2 and areal capacity 2-7 mAh/cm^2.

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