Supporting Information

Submicron Interfacial Layers for Nanoscale Control of Lithium Deposition in Surface-Engineered Current Collectors

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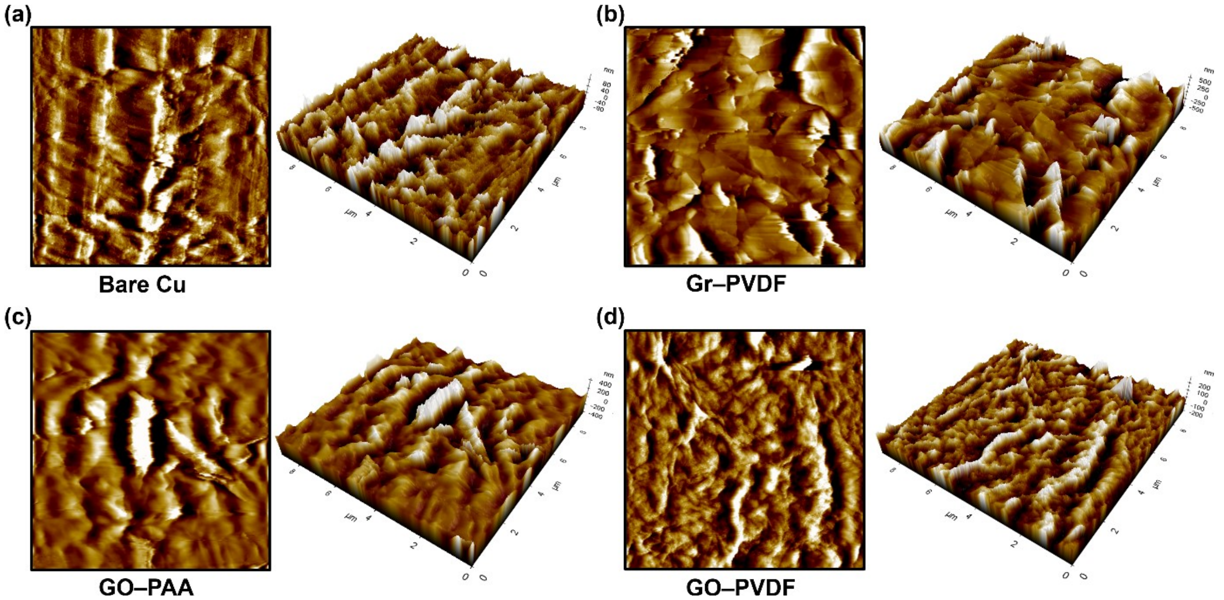

Figure S1. AFM topographic images and corresponding 3D surface morphologies of (a) bare Cu, (b) Gr–PVDF, (c) GO–PAA, and (d) GO–PVDF.

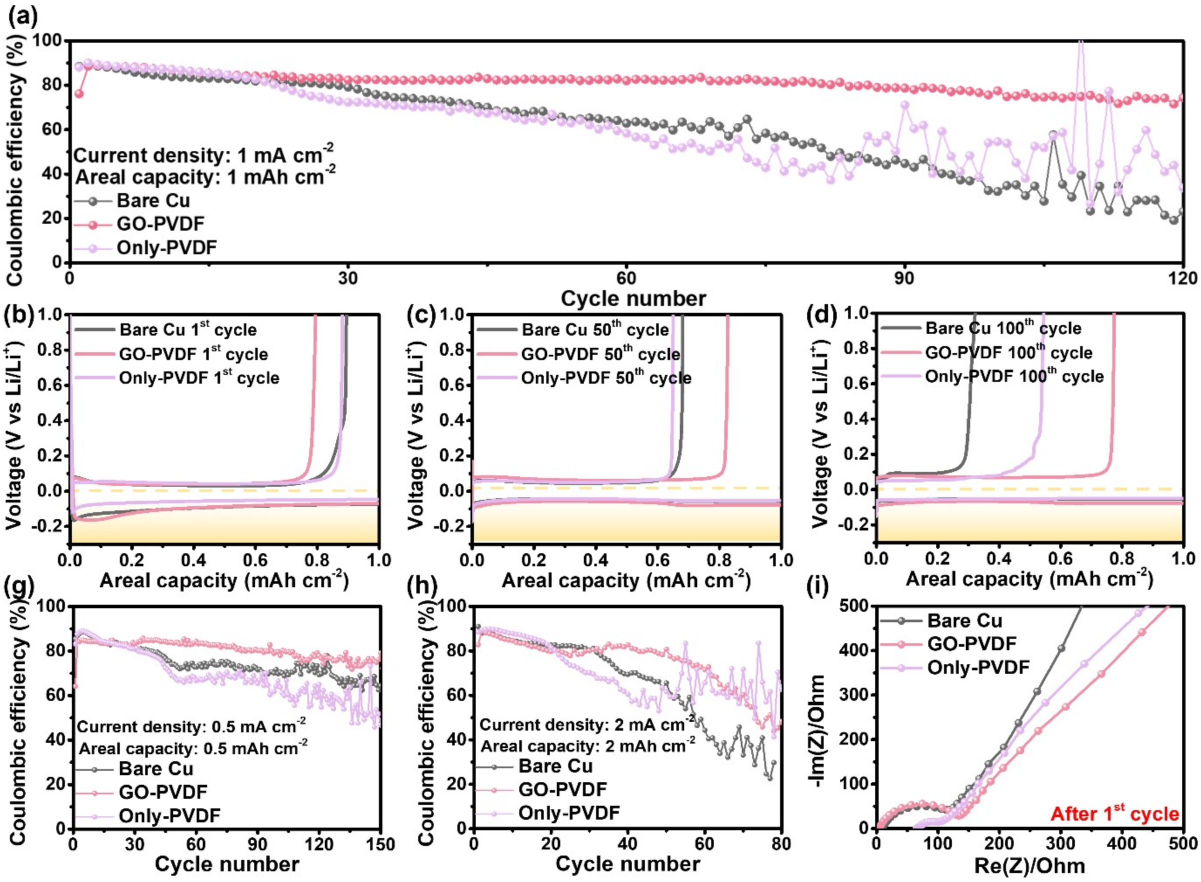

Figure S2. (a) Cycling performance of Li||Cu half cells employing bare Cu, GO–PVDF, and Only-PVDF at a current density of 1.0 mA cm⁻² and an areal capacity of 1.0 mAh cm⁻². Galvanostatic charge–discharge profiles at the (b) 1st, (c) 50th, and (d) 100th cycles. Cycling performance at (g) 0.5 mA cm⁻² with an areal capacity of 0.5 mAh cm⁻² and (h) 2.0 mA cm⁻² with an areal capacity of 2.0 mAh cm⁻². (i) Electrochemical impedance spectroscopy (EIS) spectra acquired after the 1st cycle.

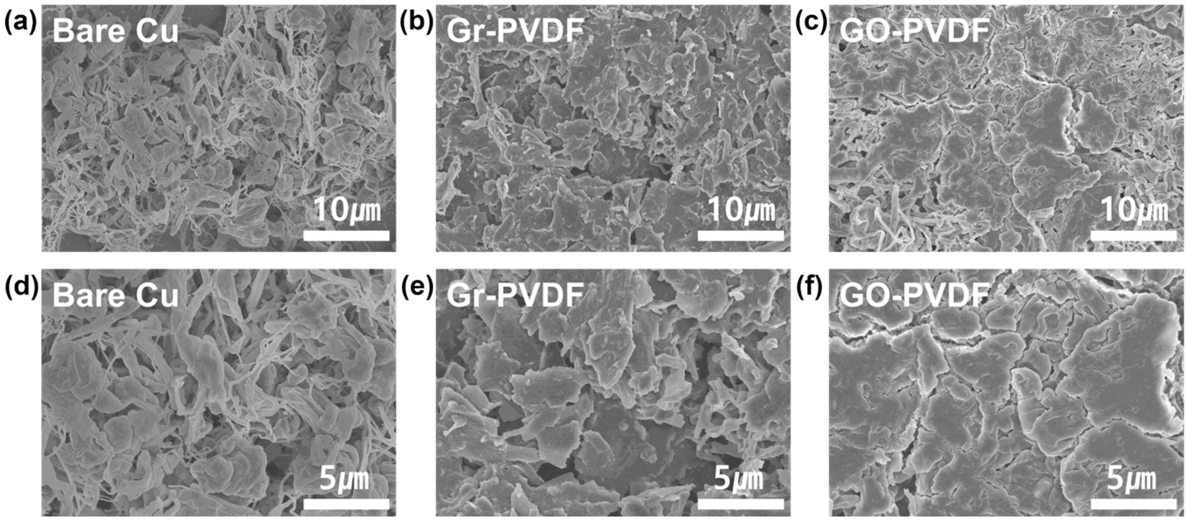

Figure S3. (a–c) Low-magnification SEM images and (d–f) high-magnification SEM images of the initially deposited Li on bare Cu, Gr–PVDF and GO–PVDF current collectors after Li plating at 0.5 mA cm^{-2} and 0.5 mAh cm^{-2}.

	Li deposit width (μm)	R_{ct} after 1 cycle(Ω)	R_{ct} after 100 cycles (Ω)
Bare Cu	0.61	113	381
Gr-PVDF	1.37	36	175
GO-PAA	1.28	102	171
GO-PVDF	2.27	134	142

Table S1. Correlation between Li growth morphology and charge-transfer resistance evolution during cycling.