

Article

Phytic-Acid-Modified Copper Foil as a Current Collector for Lithium-Ion Batteries

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Supplementary Materials

Table S1. Factors and groups of PA-based passivation solution.

Groups	Factors		
	PA (mL/L)	Na ₂ SiO ₃ (g/L)	HO(CH ₂ CH ₂ O) _n H (g/L)
1	7.5	0.15	0.75
2	10	0.3	1
3	12.5	0.45	1.25

Table S2. Electrodepositing process parameters.

pH	Groups	Processing time (s)	Temperature (°C)	current density (A dm ⁻²)
4	1	10	25	1
7	2	20	35	1
10	3	30	45	1

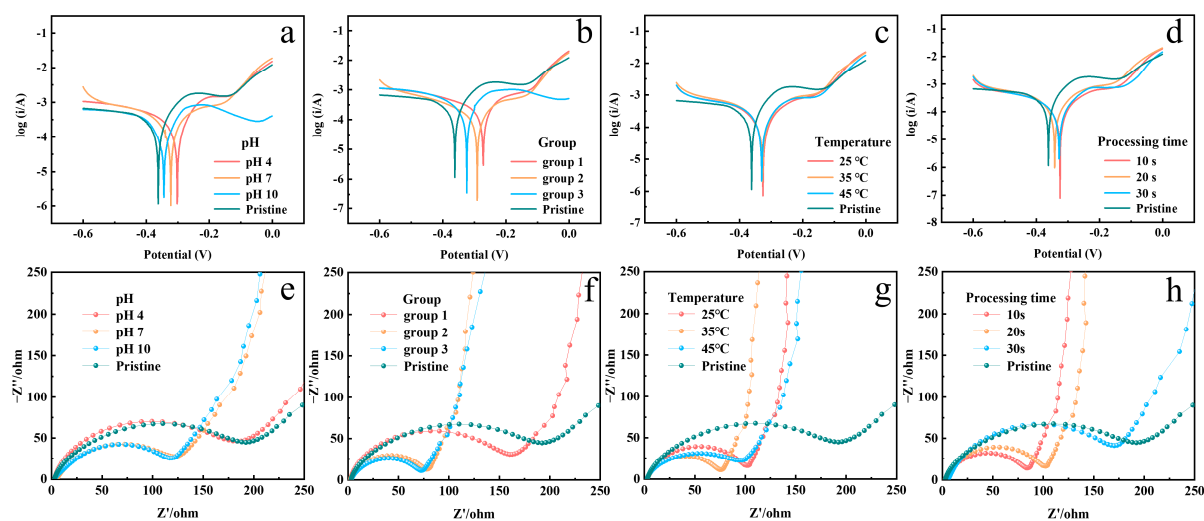


Figure S1. (a–d) Polarization curves of copper foil with different treatment parameters and the pristine Cu foil; (e–h) EIS curves of copper foil with different treatment parameters and the pristine copper foil.

Table S3. The i_{corr} and E_{corr} under different factors.

Factors		i_{corr} (10^{-4} A cm^{-2})	E_{corr} (V)
pH	4	2.241	−0.302
	7	2.185	−0.322
	10	2.567	−0.344
Groups	1	2.657	−0.272
	2	1.474	−0.291
	3	2.780	−0.324
Temperature (°C)	25	1.484	−0.326
	35	1.661	−0.328
	45	2.202	−0.330
Processing time (s)	10	0.948	−0.325
	20	1.380	−0.342
	30	1.096	−0.328
/	/	3.129	−0.362

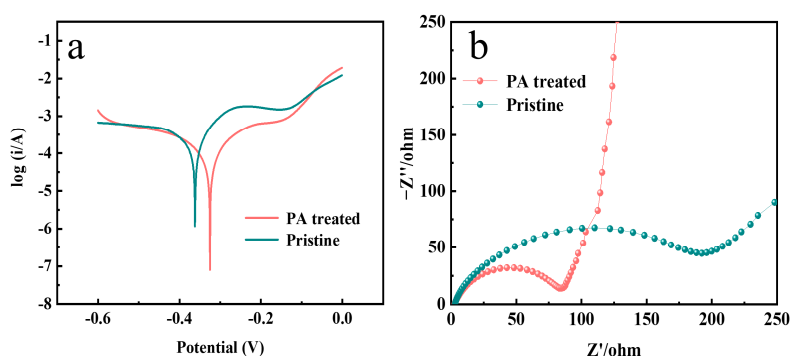


Figure S2. (a) Polarization curves (b) EIS curves of pristine Cu foil and PA-Cu foil.

Table S4. The i_{corr} and E_{corr} of the Cu foils with and without PA treatment.

	PA-Cu foil	Pristine Cu foil
i_{corr} (10^{-4} A cm^{-2})	0.948	3.129
E_{corr} (V)	−0.325	−0.362

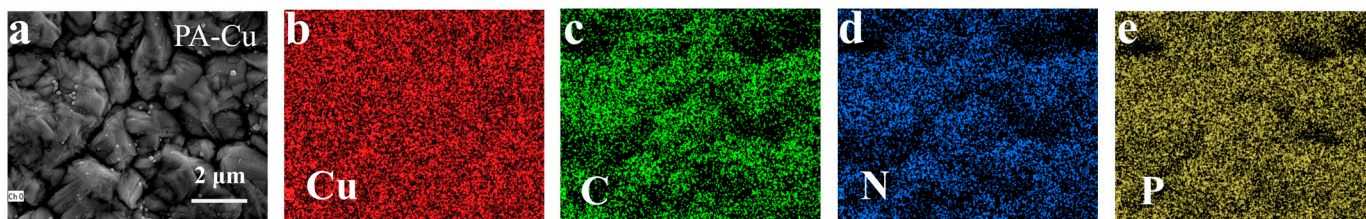


Figure S3. EDS energy spectra of PA-Cu.

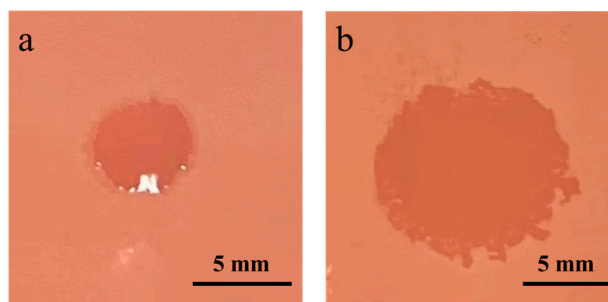


Figure S4. (a) PA-Cu foil surface and (b) pristine Cu foil surface with 1 μL electrolyte drop after 10 s.

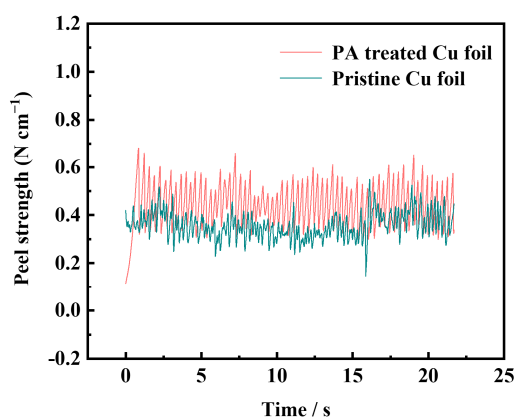


Figure S5. Peel strength of two types of copper foil.

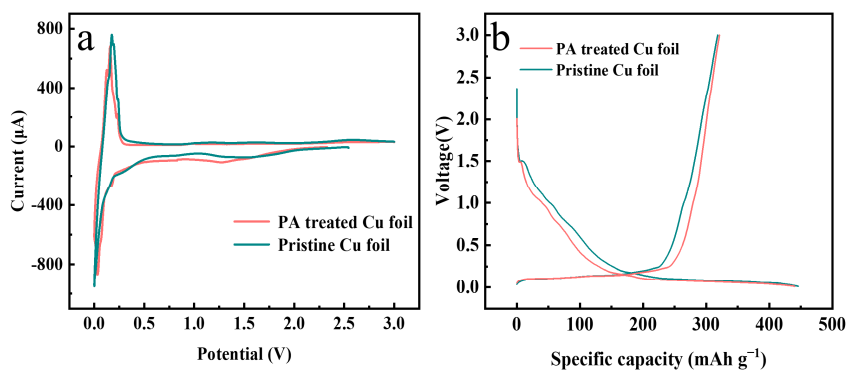


Figure S6. (a) Initial CV curves and (b) initial charge–discharge curves at 0.1 A g^{-1} of the graphite/Cu and graphite/PA-Cu electrodes.

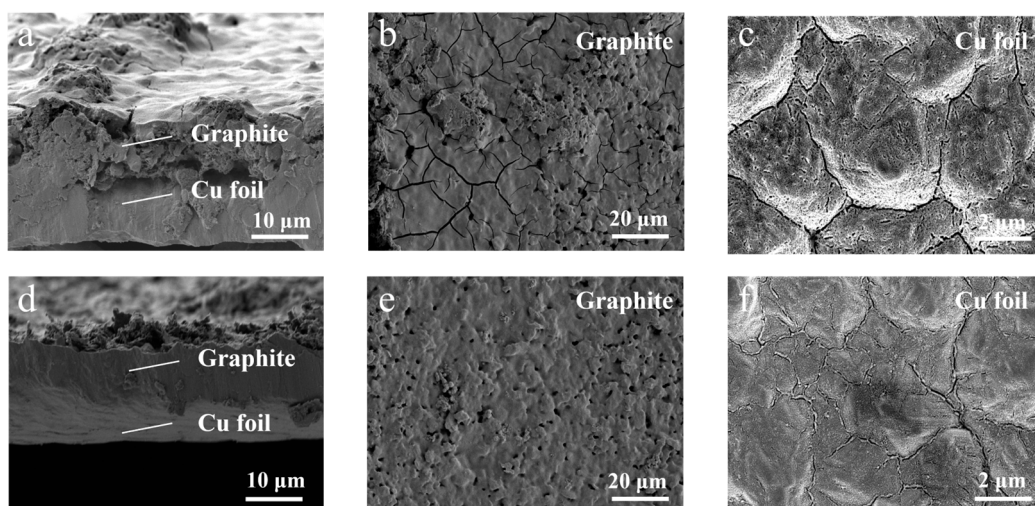


Figure S7. SEM images of (a) the cross-section of the graphite/Cu electrode, (b) the surface of the graphite/Cu electrode, and (c) the pristine Cu foil without the active substance after 200 cycles at 1 A g⁻¹; SEM images of (d) the cross-section of the graphite/PA-Cu electrode, (e) the surface of the graphite/PA-Cu electrode, and (f) the PA-Cu foil without the active substance after 200 cycles at 1 A g⁻¹.