Supporting Information

Lithiophilic Ag Nanoparticle Layer on Cu Current Collector towards Stable Li Metal Anode

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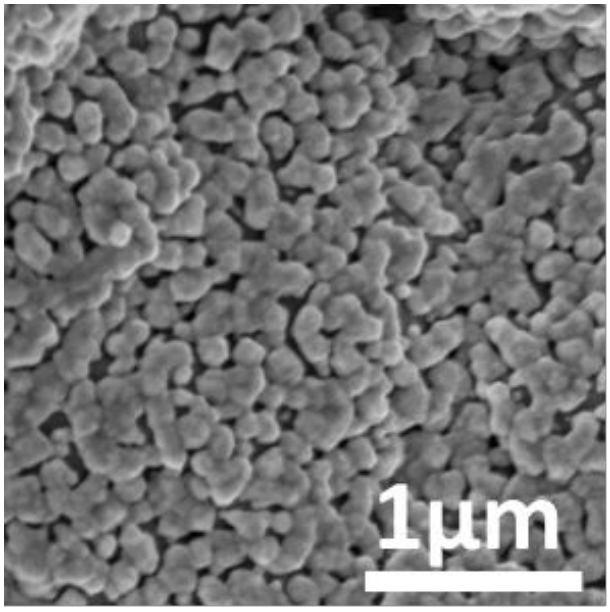

Figure S1. SEM image of CuAg sample synthesized via electroless plating time with 3 min.

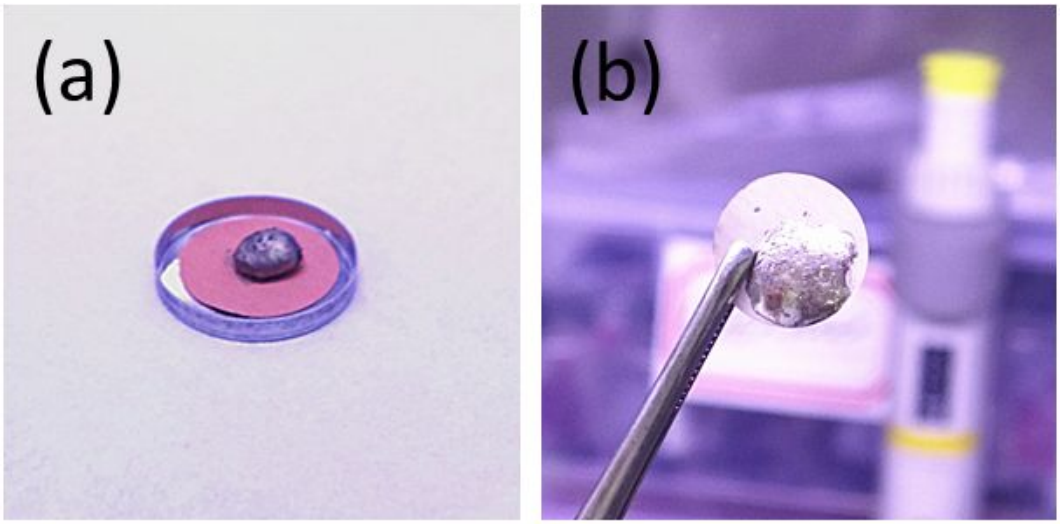

Figure S2. Lithiophilicity difference between bare Cu foil (a) and CuAg-1.5 sample (b), by placing molten Li onto them.

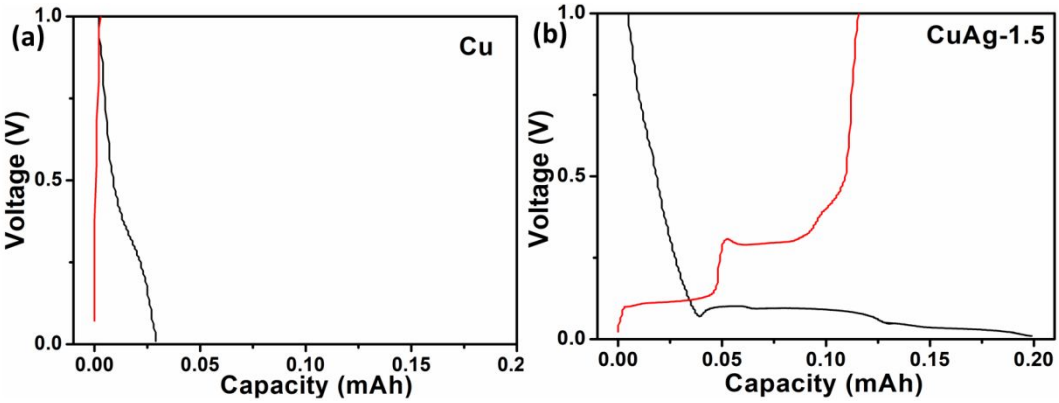

Figure S3. First charge/discharge cycles of (a) Cu foil and (b) CuAg-1.5 sample using Li foil as the counter/reference electrode from 0.01 V to 1 V at 0.2 mA cm^{-2}.

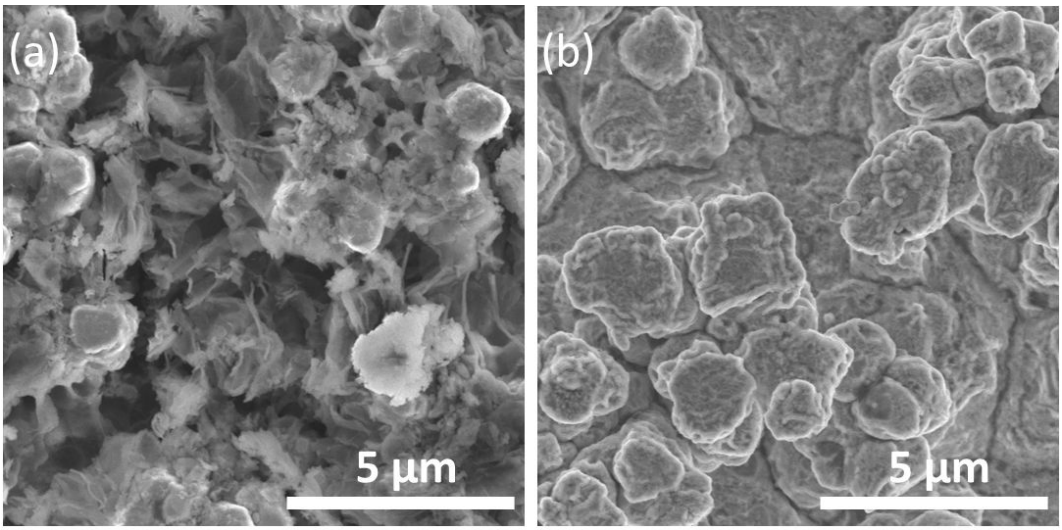

Figure S4. SEM images of (a) Cu foil and (b) CuAg-1.5 sample current collectors after Li stripping 2 mAh cm^{-2} (recharged to 0.5 V).

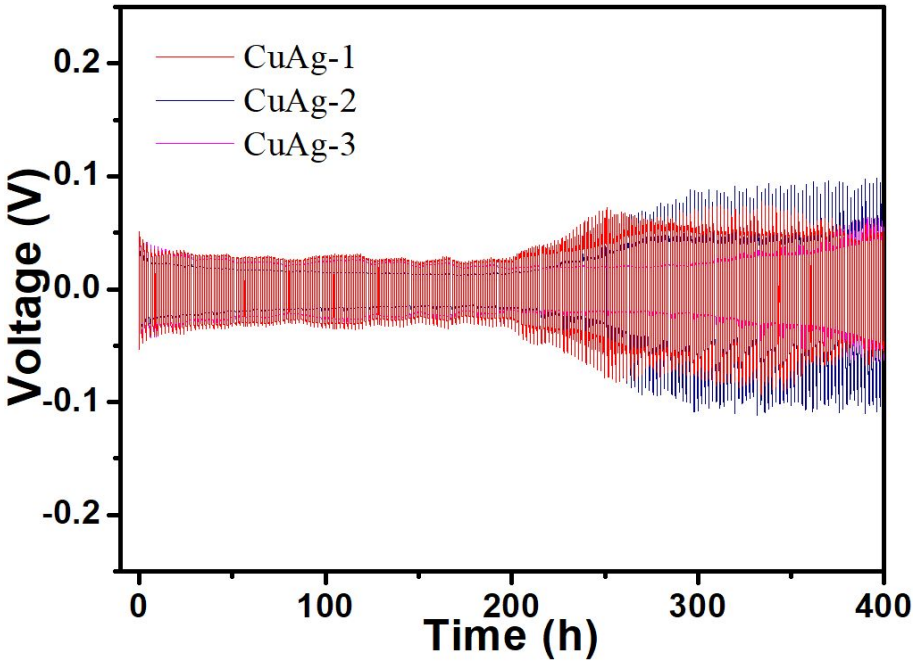

Figure S5. The voltage-time curves of Li anode plating/stripping with a cycling capacity of 1 mAh cm^{-2} at 1 mA cm^{-2} of CuAg-1, CuAg-2 and CuAg-3 samples.

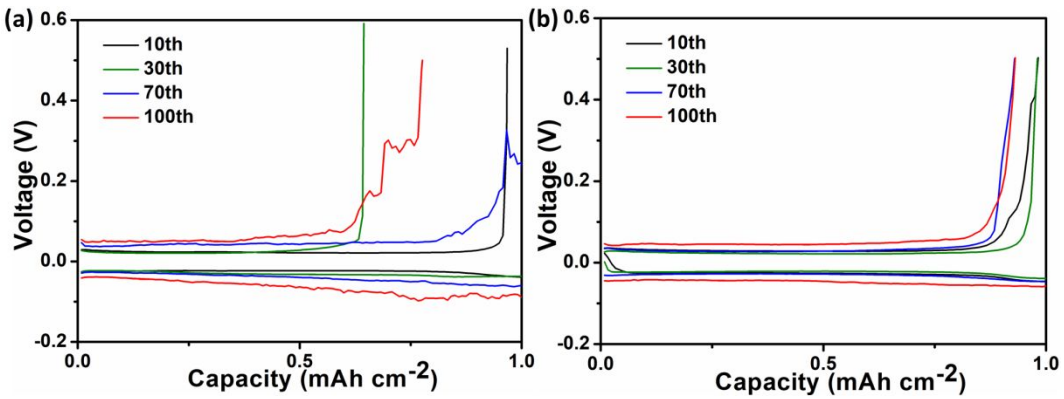

Figure S6. The voltage-capacity curves of the 10th, 30th, 70th, and 100th cycle of Cu (a) foil and CuAg-1.5 sample (b) with a cycling capacity of 1 mAh cm^{-2} at 1 mA cm^{-2}.

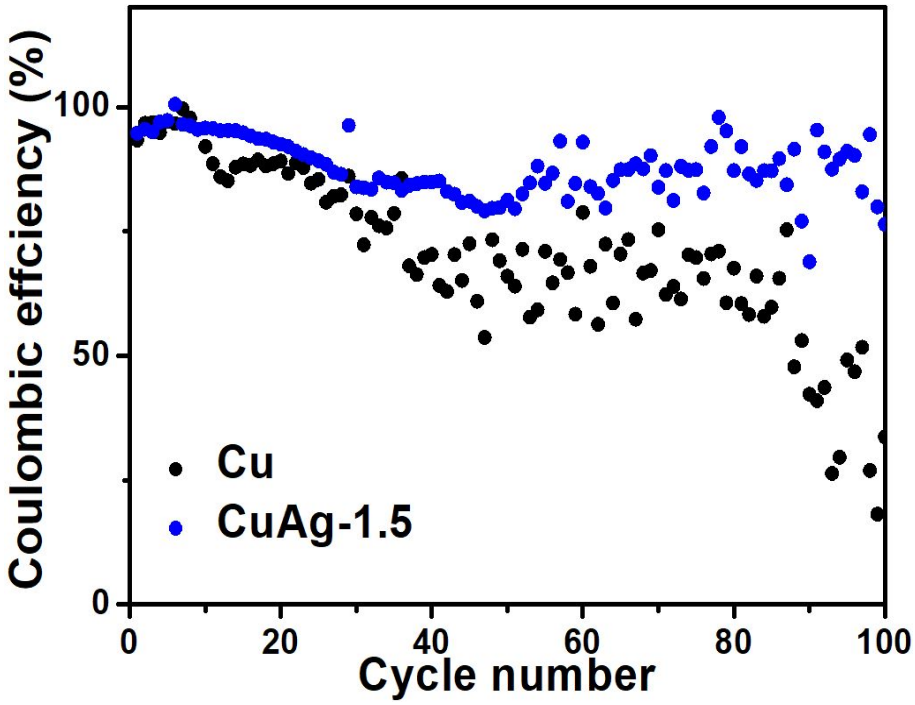

Figure S7. Coulombic efficiencies of the Cu foil and CuAg-1.5 sample with an areal capacity of 1 mAh cm^{-2} at 1 mA cm^{-2} using 2 wt% $LiNO_3$ additives. The CuAg-1.5 sample presents the average CE of 88% for 100 cycles, while the Cu foil exhibits a much lower average CE of 70%.

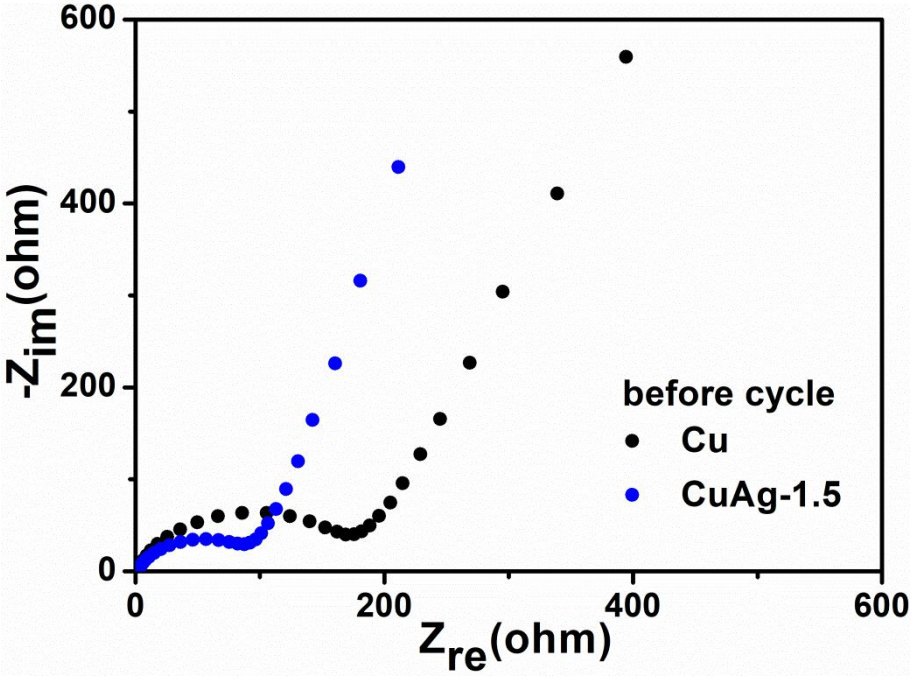

Figure S8. The Nyquist curves of the Cu foil and CuAg-1.5 sample in symmetrical cells before cycling.

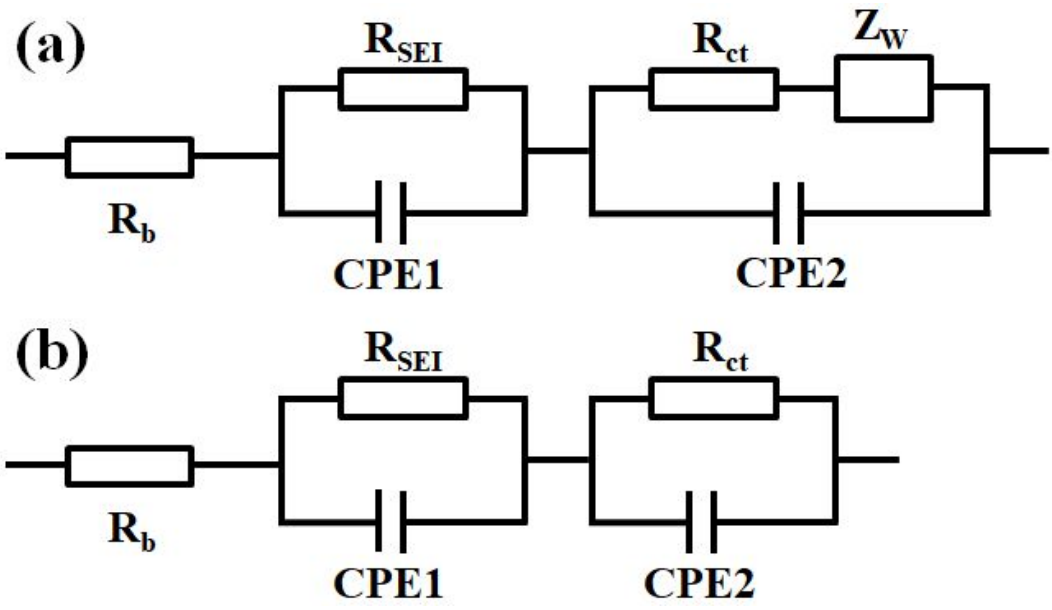

Figure S9. Equivalent circuit model for EIS plots of (a) Cu foil and (b) CuAg-1.5 sample.

We use two different equivalent circuits for Cu foil and CuAg-1.5 sample, that is, Warburg element (Z_W) is used in the equivalent circuit for Cu foil but not for CuAg-1.5 sample. This is because a straight line related to mass transfer control has been observed in low frequency range in the Nyquist curves of Cu foil, although it is not completely shown.

Table S1. Electrochemical impedance fitted results of equivalent circuit models of the Cu foil and CuAg-1.5 sample after 100 cycles.

	R_b (Ω)	R_{SEI} (Ω)	R_{ct} (Ω)
Bare Cu foil	11.87	37.87	19.44
CuAg-1.5 sample	2.39	1.44	11.99

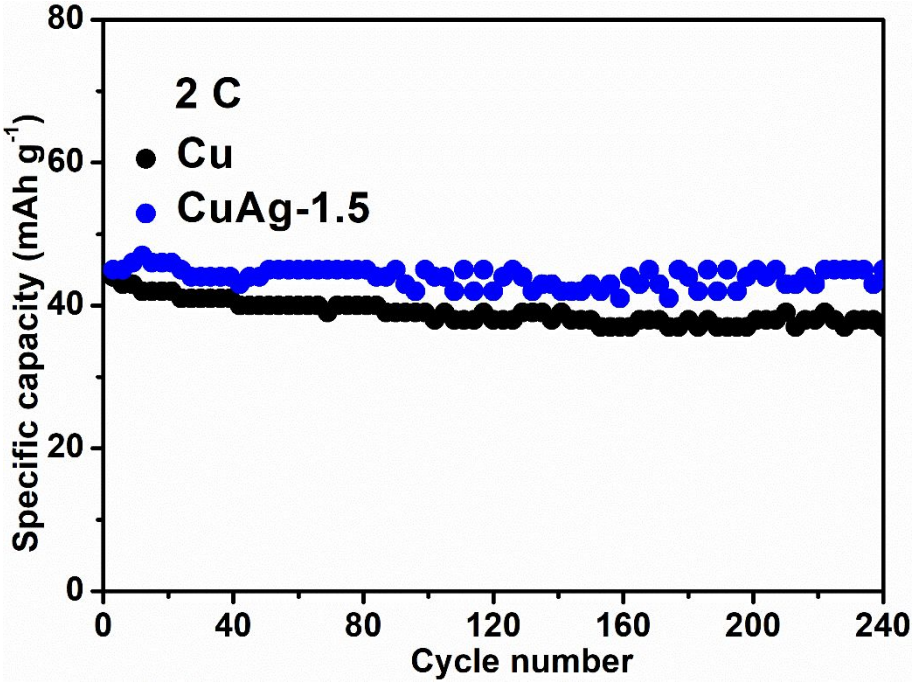

Figure S10. Cycling performances of Li@Cu||LFP and Li@CuAg-1.5||LFP full cells at 2 C.

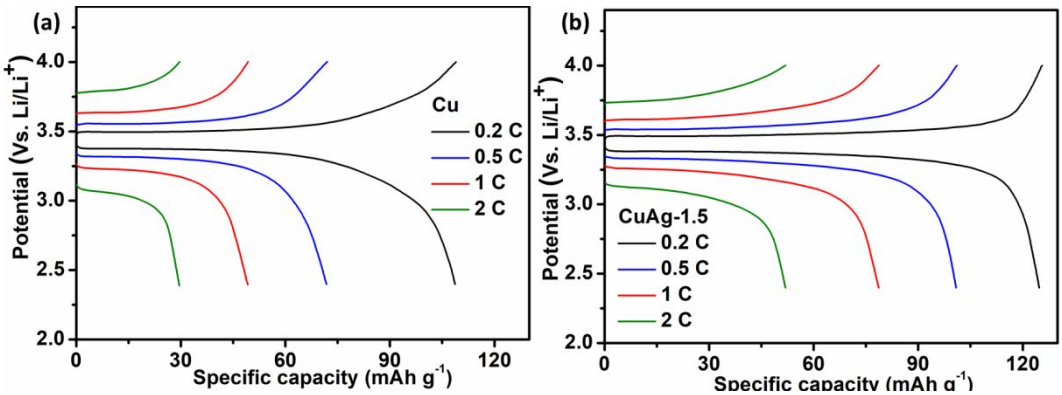

Figure S11. Charge-discharge curves of Li@Cu||LFP (a) and Li@CuAg-1.5||LFP full cells (b) at rates of 0.2 C, 0.5 C, 1 C and 2 C.