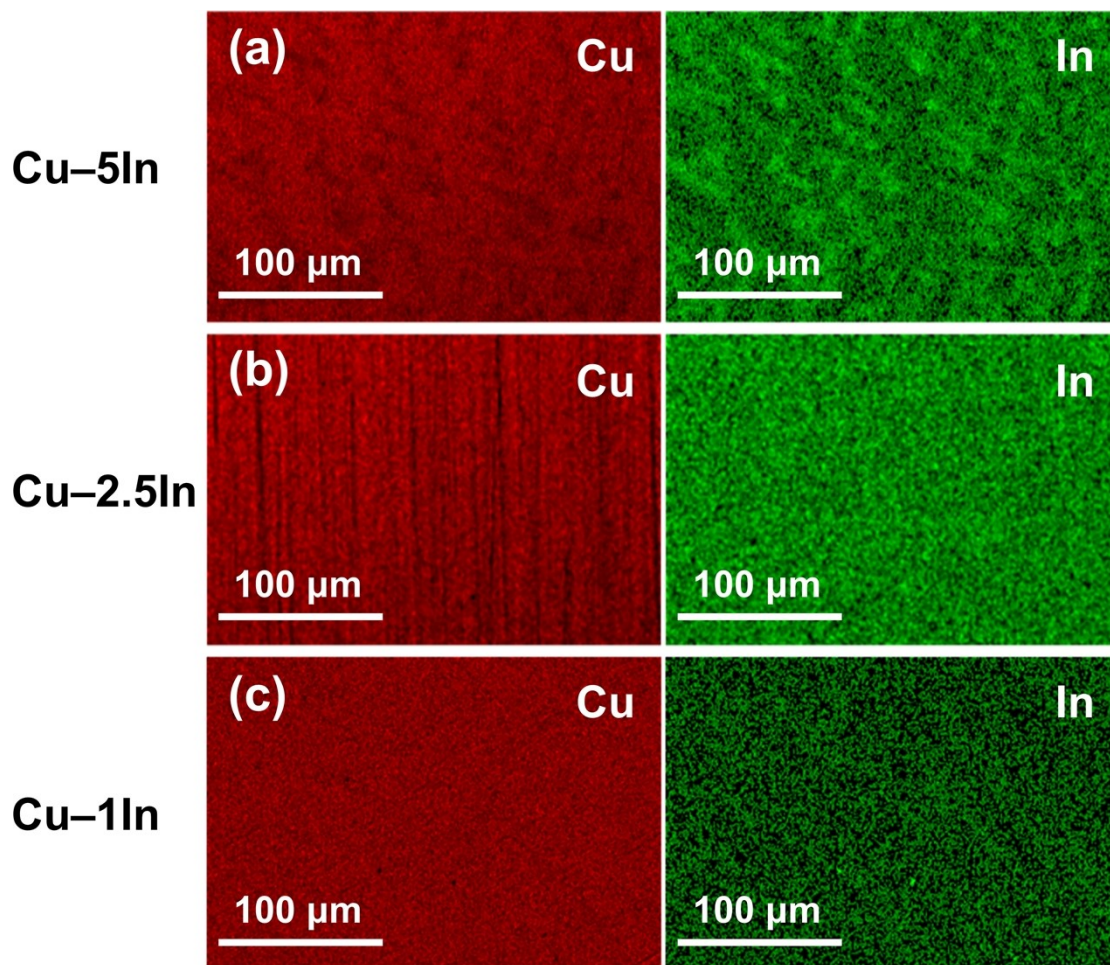
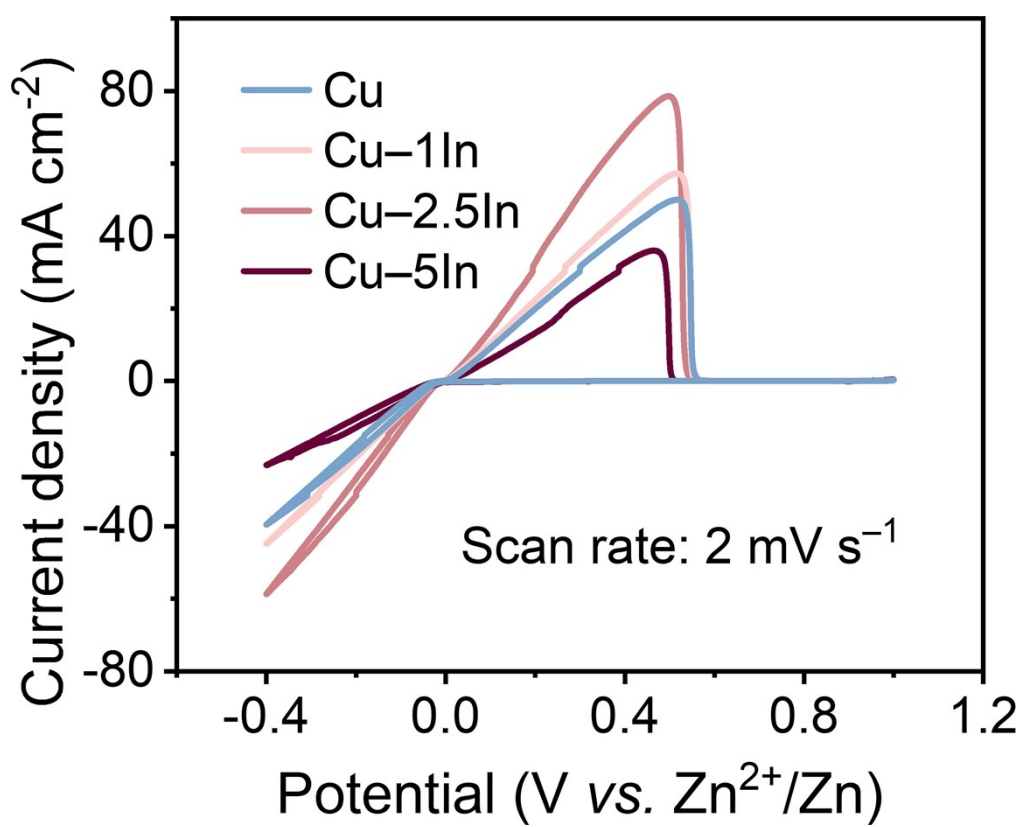


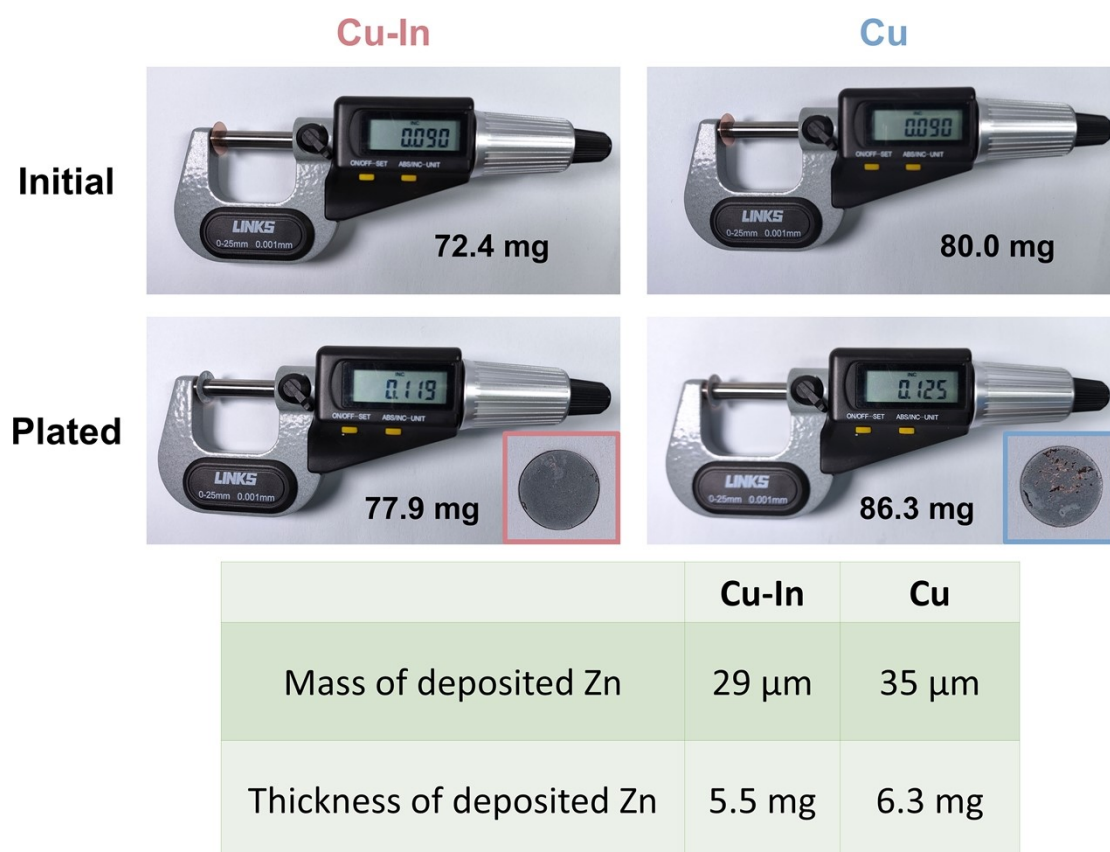
Fig. S1 Cu-In phase diagram.



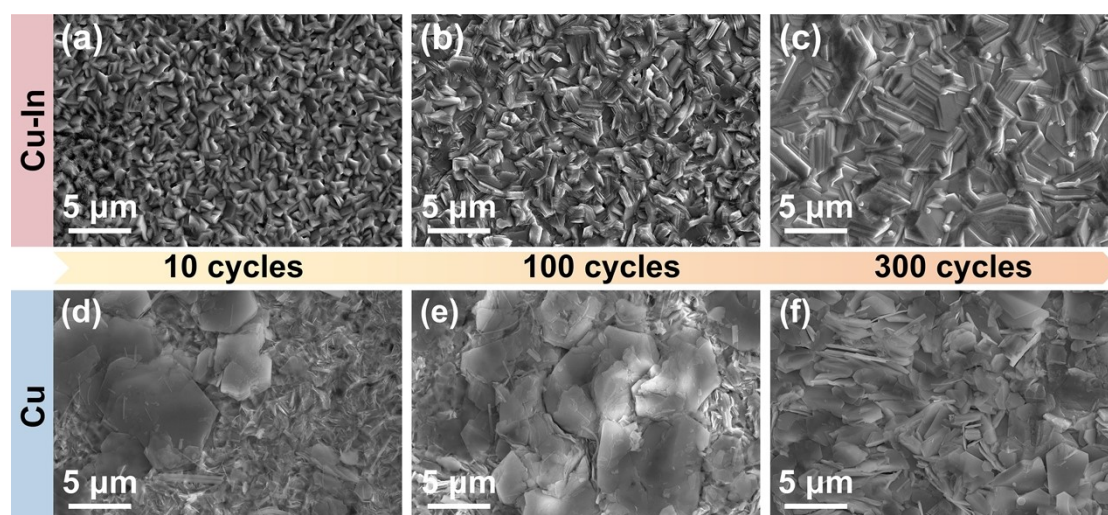
**Fig. S2** EDS mapping of three Cu-In alloy and pure Cu.



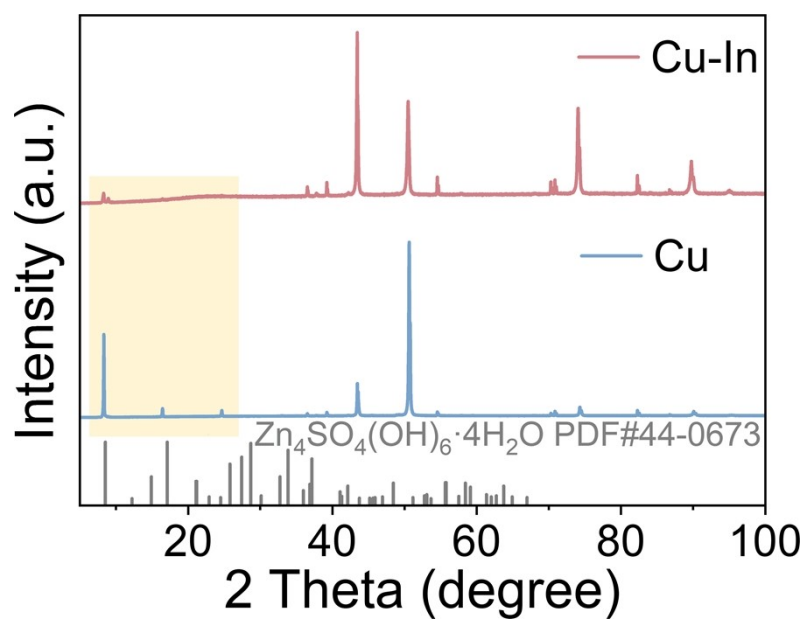
**Fig. S3** CV curves of asymmetric cells.



**Fig. S4** Details on the current collector before and after Zn pre-deposition.



**Fig. S5** SEM images of the deposited Cu–In (a–c) and Cu (d–f) electrodes after cycling 10, 100, and 300 times in the asymmetric battery.



**Fig. S6** XRD patterns after cycling 10 cycles in the asymmetric battery.