Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Electrodeposited Thin-Film Cu_xSb Anodes for Li-ion Batteries: Enhancement of Cycle Life via Tuning of Film Composition and Engineering of the Film-Substrate Interface

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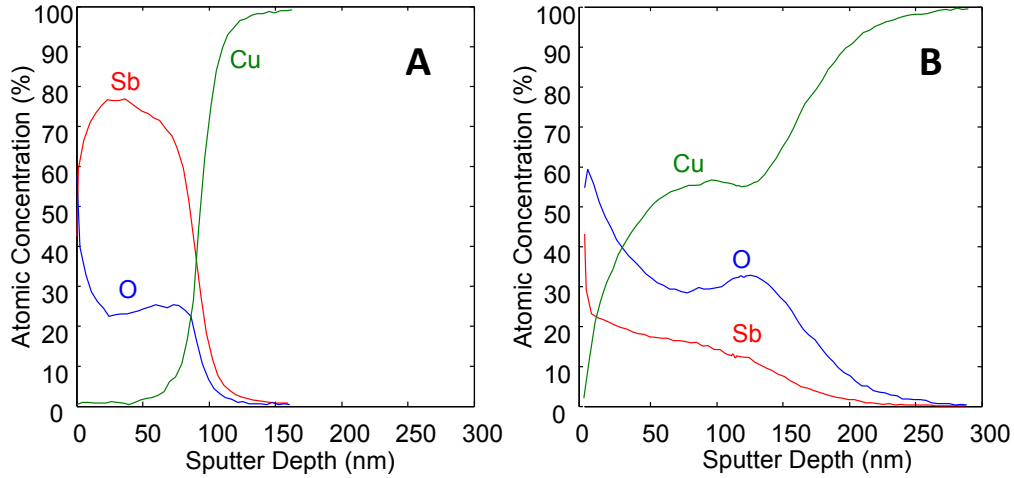

Fig. S1 Auger depth profiles of amorphous Sb@Cu anodes before (A) and after (B) cycling in a Li-ion half-cell.

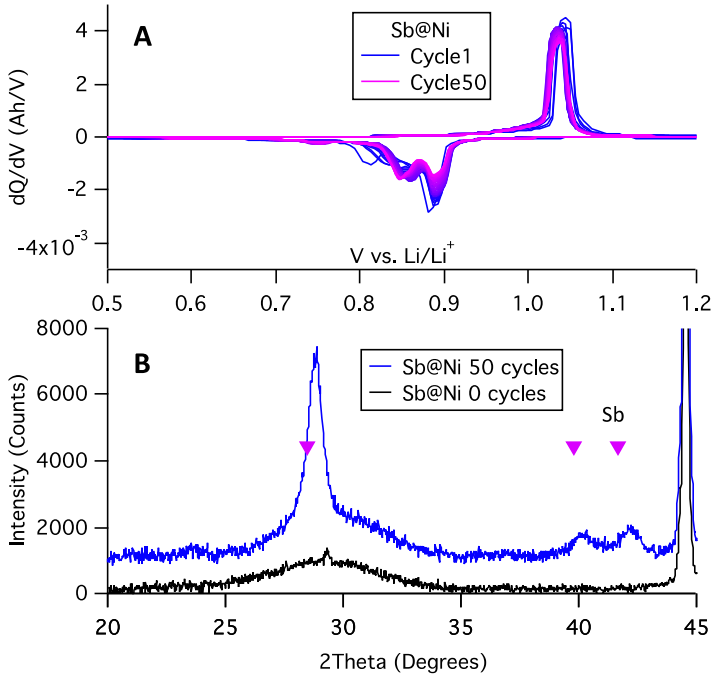

Fig. S2 (A) Differential capacity plot of an amorphous Sb@Ni anode cycled in a Li-ion half-cell. (B) PXRD of the same Sb@Ni anode both before and after cycling.

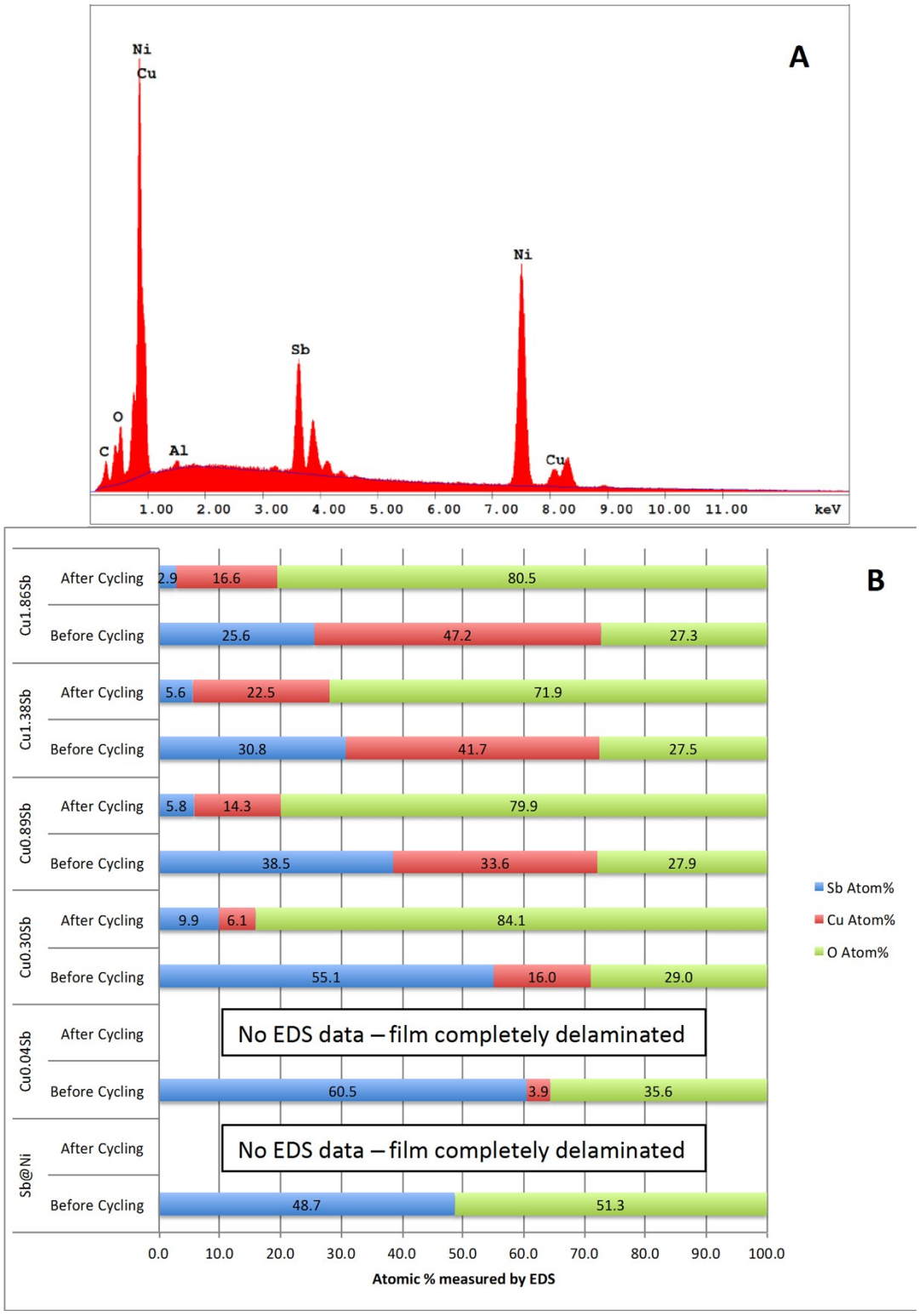

Fig. S3 (A) Representative EDS spectrum used to quantify the composition of the electrodeposited films, (B) Composition of the amorphous Cu_xSb films as measured by EDS both before and after cycling in Li-ion half-cells. Note that carbon was not included in the quantification of the composition, and that the large oxygen composition is likely due to the presence of a fairly reactive SEI layer on the surface of the thin films.

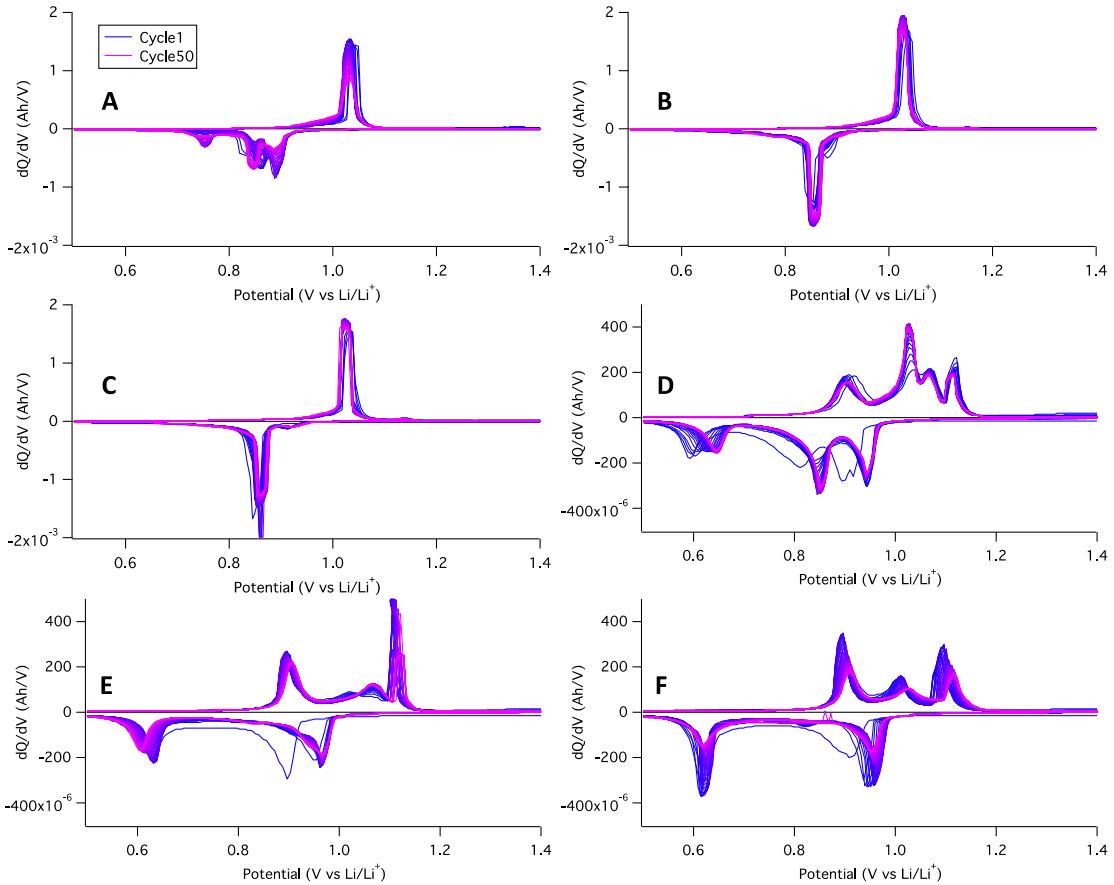

Fig. S4 Differential capacity plots for the first 50 cycles of the amorphous Cu-Sb@Ni anodes in Li-ion half-cells. The compositions of the anodes are: (A) Sb-only, (B) $Cu_{0.04}Sb$, (C) $Cu_{0.30}Sb$, (D) $Cu_{0.89}Sb$, (E) $Cu_{1.38}Sb$, (F) $Cu_{1.86}Sb$.

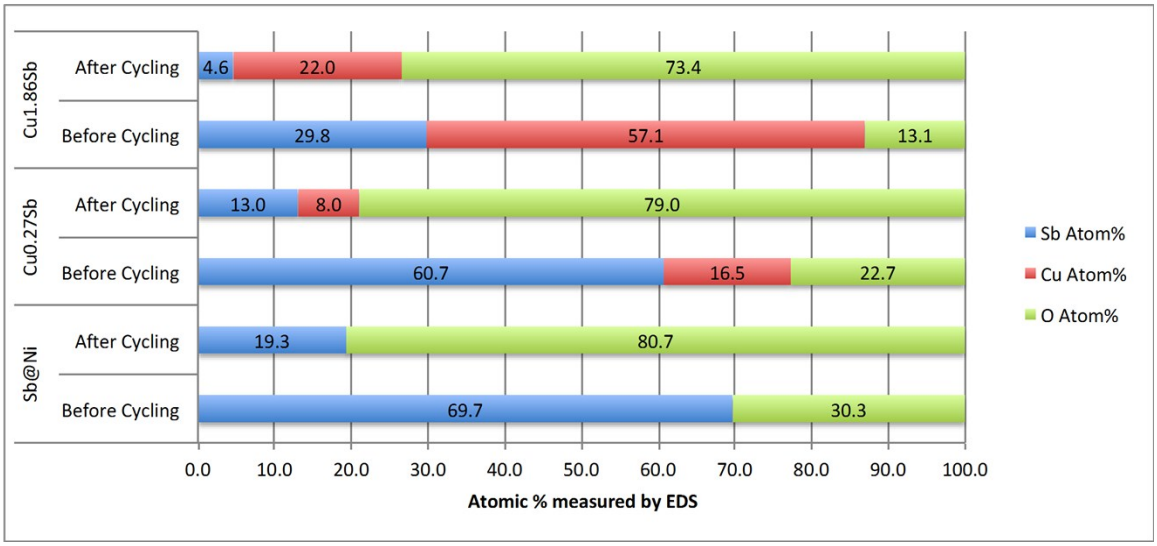

Fig. S5 Composition of the crystalline Cu_xSb@Ni films as measured by EDS both before and after cycling in Li-ion half-cells (see explanation in the caption for Fig. S3).

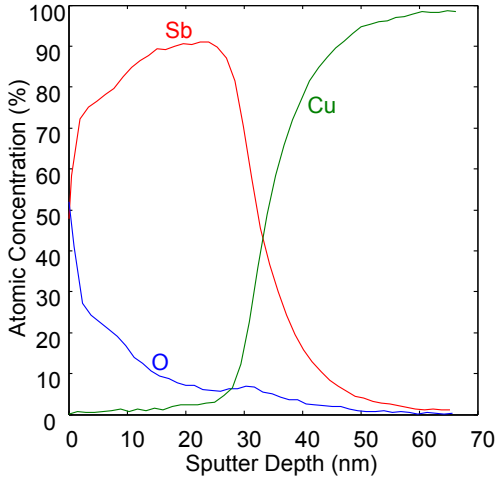

Fig. S6 Auger depth profile of a crystalline Sb@Cu anode before cycling.

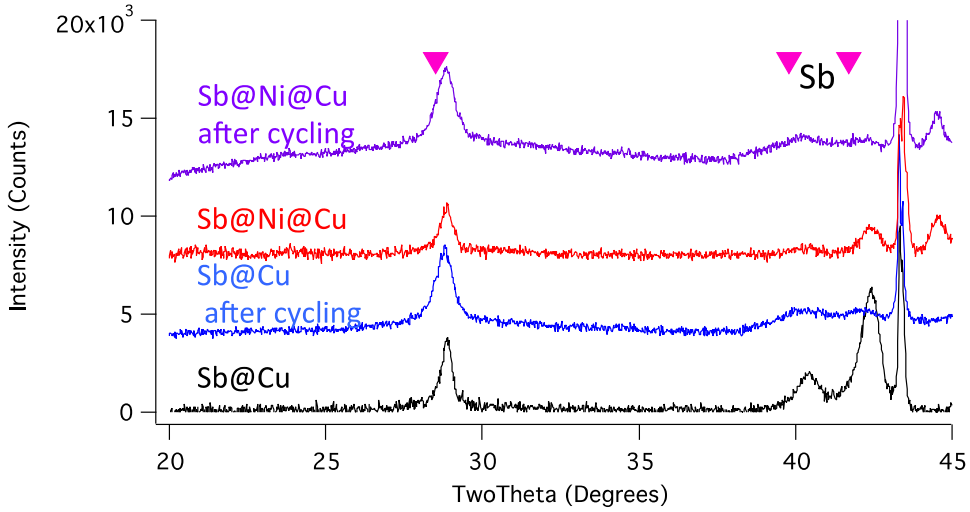

Fig. S7 PXRD of crystalline anodes before and after cycling in Li-ion half-cells.

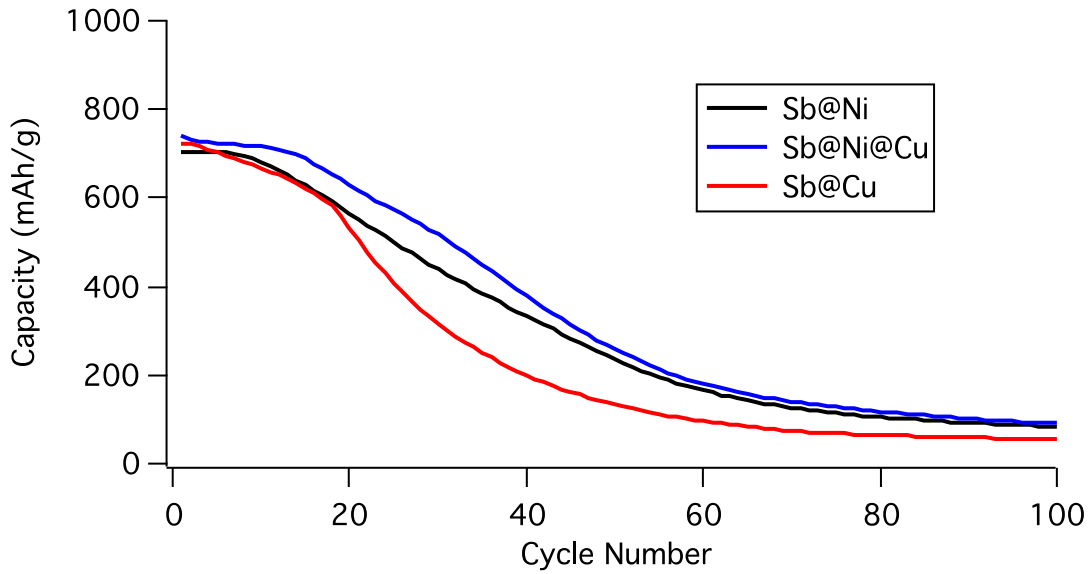

Fig. S8 Cycle lifetime plot comparing crystalline anodes with the following architectures: Sb@Cu, Sb@Ni, Sb@Ni@Cu.

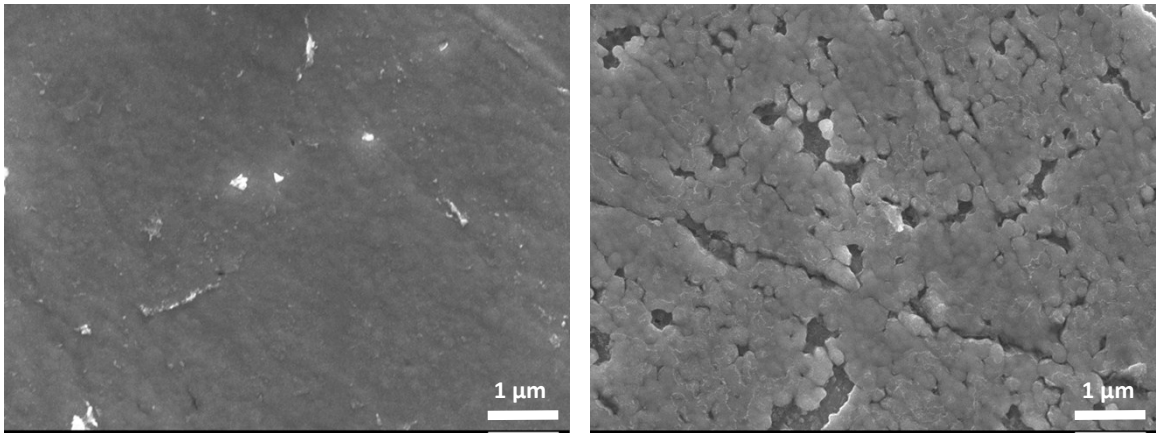

Fig. S9 SEM images comparing a pre- (left) and post-cycled (right) Ni-blocking layer.