

Electronic Supplementary Material

Li-insertion/extraction property of three-dimensional Sn electrode prepared by facile electrodeposition method

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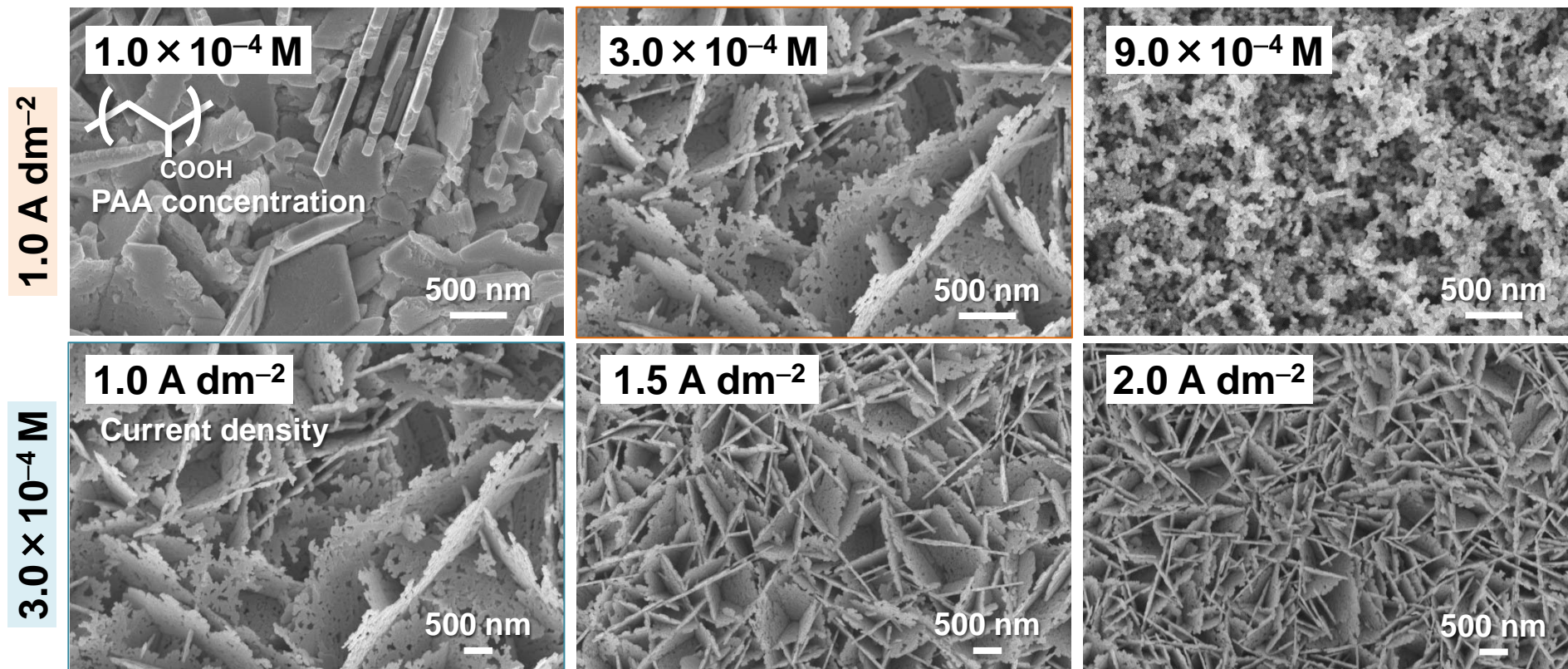


Figure S1 FE-SEM images of 3D-Cu substrates prepared by electrodeposition using electroplating bath consisted of 0.85 M copper (II) sulfate (CuSO_4 ; 99.5%) and 0.55 M sulfuric acid (H_2SO_4) aqueous solution with polyacrylic acid (PAA). The effect of (upper) PAA concentration and (lower) applied current density on morphology of three-dimensional structure. The current density and PAA concentration were fixed on 1.0 A dm^{-2} and $3.0 \times 10^{-4} \text{ M}$, respectively.

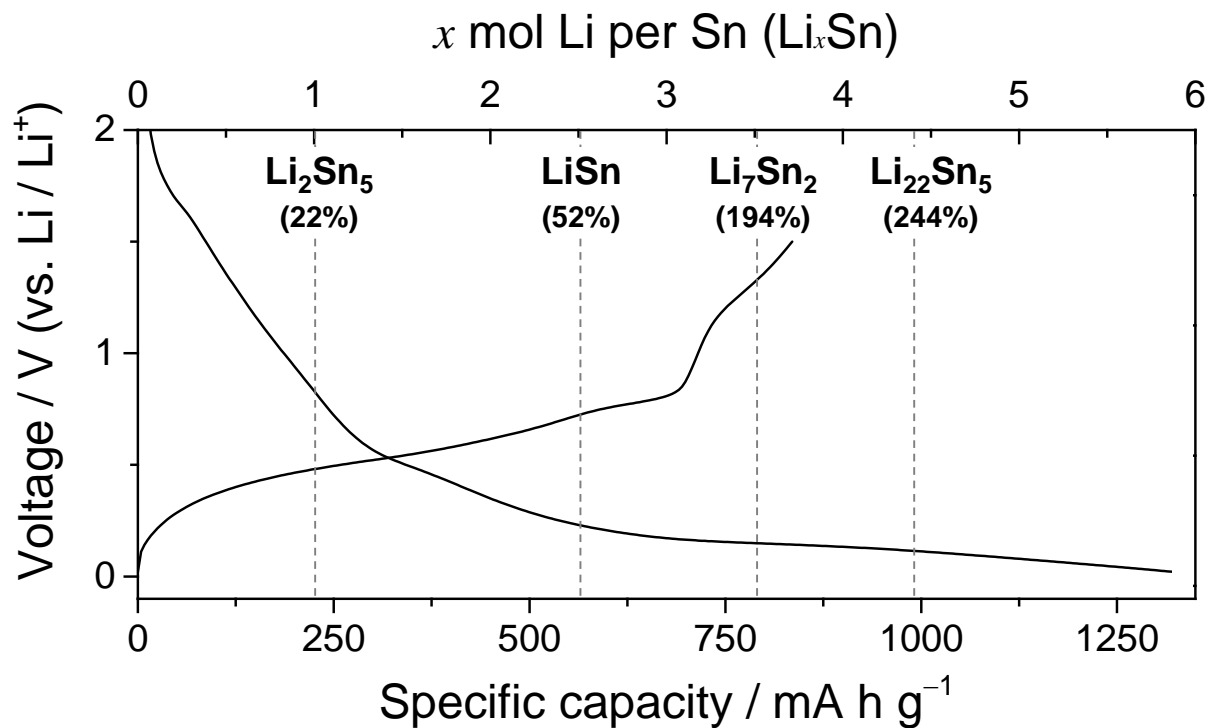
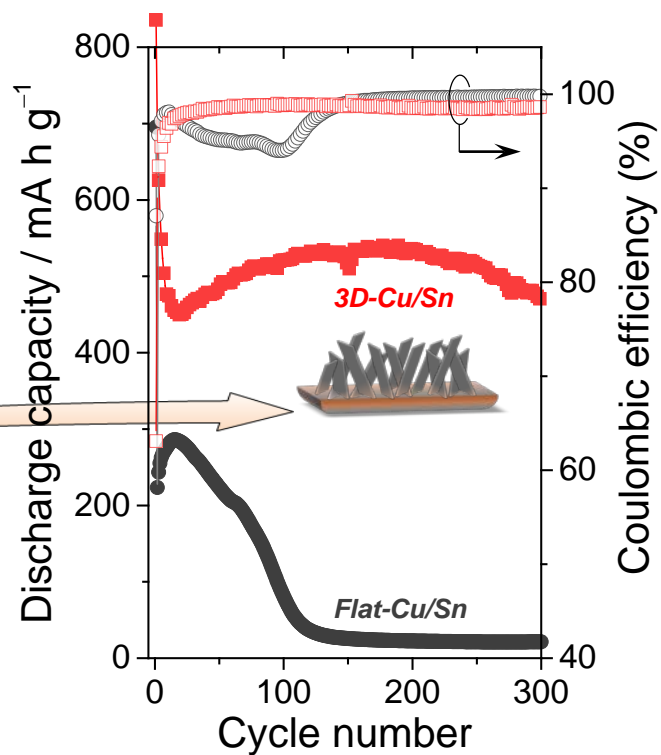
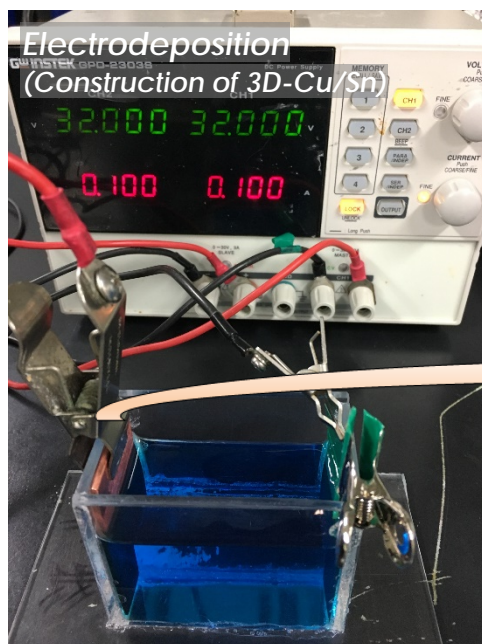


Figure S2 Initial charge–discharge (Li-insertion/extraction) profile of 3D-Cu/Sn composite electrode. Upper X axis corresponds to mole number of Li per Sn (Li_xSn). Sn undergoes alloying reactions with Li to transform into Li₂Sn₅, LiSn, Li₇Sn₂, and Li₂₂Sn₅, step by step. The volumetric change ratio from Sn to the respective Li–Sn phases are 22%, 52%, 194%, and 244%.

Graphical abstract



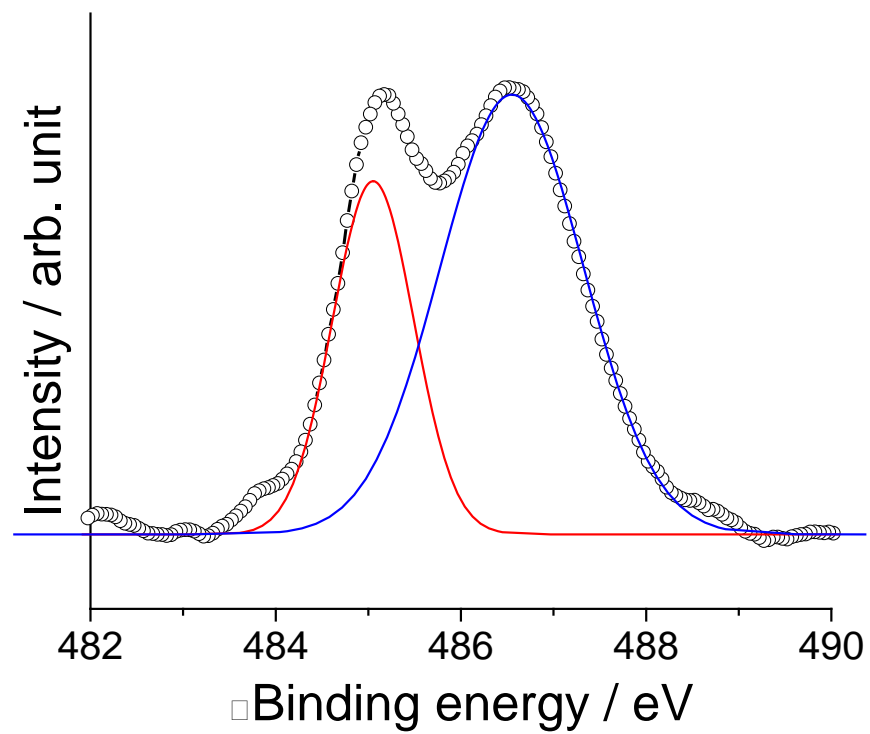


Figure S1 XPS spectrum of 3D-Cu/Sn electrode.