Electrodeposited, High Surface-Area Intermetallic Anodes for Lithium Ion Batteries

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- Intermetallic anodes composed of Cu-Sn-Sb compounds offer high gravimetric and volumetric capacities for Li-ion storage
- Electrodeposition is a versatile and low-cost synthetic method for anodes with strong electrical connections to the current collector
- High surface-area copper foams, used as “3-D” current collectors, allows room for anode material expansion, thus improving cycle life
- Electrodes characterized by SEM, EDS, XRD, and 4-point Nanoprobe before and after coin cell cycling
- Electrodeposited intermetallic anodes performing better than traditional laminated counterparts and have opened many routes for future research endeavors

Above: Scanning electron micrograph of Cu$_2$Sb intermetallic compound electrodeposited onto Cu-foam current collector


Electrodeposition Setup

Deposition of Cu-foam current collectors and intermetallic materials are performed in 3-electrode cells, as depicted above.

W = working electrode
R = reference electrode
C = counter electrode