

Use of Tin Based Composite Nanorod Anodes for  
Rechargeable Lithium Applications

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An oblique angle codeposition technique was used to fabricate Sn based thin films containing nanorods. The compositions of the thin films were different. The results demonstrated that pure Sn nanorods have a higher initial anodic capacity around  $980 \text{ mAhg}^{-1}$ , but the capacity diminishes after 20 cycles due to the morphological changes and the cycling continued upto 50<sup>th</sup> cycles, then it failed. By introducing approximately 50 at.% Cu into Sn nanorods, an anode material containing Cu-Sn composite nanorods was fabricated. This electrode demonstrated approximately  $800 \text{ mAhg}^{-1}$  of initial discharge capacity. Its capacity diminished gradually after the first five cycles, then it was stable up to 70<sup>th</sup> cycles with a discharge capacity around  $350 \text{ mAhg}^{-1}$ . The long cycle life and the advanced electrochemical properties of thin film anode is attributed to the flexibility and improved toughness of CuSn composite nanorods.

Keywords: Cu-Sn thin film, oblique angle deposition, lithium ion batteries, anode.