

Use of Tin Based Composite Nanorod Anodes for
Rechargeable Lithium Applications

B.Deniz Polat¹, Nagihan Sezgin¹, Özgül Keleş¹

¹ Department of Metallurgical and Materials Engineering,
Istanbul Technical University, Maslak, Istanbul, 34469
(Turkey)

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 mAhg⁻¹, but the capacity diminishes after 20 cycles due to the morphological changes and the cycling continued upto 50th 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 800mAhg⁻¹ of initial discharge capacity. Its capacity diminished gradually after the first five cycles, then it was stable up to 70th cycles with a discharge capacity around 350 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.