

Tin oxide–based anodes for both lithium-ion and sodium-ion batteries

Kebede, Mesfin A

Abstract:

Tin oxide, SnO₂, is a suitable anode for both lithium-ion and sodium-ion batteries (LIBs and SIBs) unlike graphite and silicon, which are only suitable anodes for LIB. SnO₂ has garnered much attention because of its high theoretical capacities (LIB = 1494 mA h g⁻¹ and SIB = 1378 mA h g⁻¹). However, the commercialization of SnO₂ anodes is still hugely challenged because these anodes suffer from large volume expansion caused by lithiation/delithiation or sodiation/desodiation during cycling, leading to severe capacity fading. The adopted strategies to solve these problems are nanosizing that greatly improves the structural stability of the material and helps to have fast reaction kinetics. Synthesizing nanocomposite of SnO₂ nanoparticles with nanoporous carbonaceous materials to buffer the volume expansion, enhance cycling stability; create oxygen deficiency to improve intrinsic conductivity. In this review, the recent research trends on SnO₂ as anode for both LIB and SIB systems are presented.