Sol-gel synthesis of ZnO/TiO₂ core-shell nanocomposites and their structural and electrochemical characterization as anode for lithium ion battery

Yaofeng Ma

Zhengzhou University of Technology, Zhengzhou, 450066, China

E-mail: yfmazz1985@163.com

doi: 10.20964/2020.12.04

Received: 18 July 2020 / Accepted: 21 September 2020 / Published: 31 October 2020

This study focused on synthesis of ZnO/TiO₂ core-shell nanocomposites on copper substrate by sol-gel method and their structural and electrochemical characterization as anodes for lithium ion batteries. SEM and XRD results exhibited the high density of the ZnO/TiO₂ nanocomposite in core-shell morphology were synthesized on copper foil. Electrochemical studies showed more stable behavior, higher capacity, coulombic efficiencies and excellent reversibility and long-life cycling performance of ZnO/TiO₂ core-shell nanocomposite compared to the ZnO and TiO₂ films. EIS studies demonstrated the synergistic effect of ZnO/TiO₂ core-shell structures leading to improvement in the diffusion of lithium-ions into anode due to creation of the high surface area, short lithium-ions diffusion path and high electron transportation rate. Coulombic efficiency of ZnO/TiO₂ core-shell nanocomposites was achieved more than 98% which was higher than the obtained values of ZnO (94%) and TiO₂ (93%) films.

Keyword: Lithium ion battery; ZnO/TiO₂ core-shell nanocomposites; Coulombic efficiency; Capacity; Reversibility; Cycling performance

[FULL TEXT](#)

© 2020 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).