

Fabrication and electrochemical characteristics of silicon-encapsulated oxide composites

박상은¹, 이중기^{1,*}, 이상화², 김보은^{1,3}
¹한국과학기술연구원; ²경원대학교; ³동국대학교
(leejk@kist.re.kr*)

Silicon composites of nano-capsule type were newly applied as an active anode material for lithium ion battery. Oxide-encapsulated silicon powder was synthesized by a sol-gel reaction with metal alkoxide, followed by a thermal treatment process. Silicon nanopowders were successfully embedded into porous oxide composites which could play buffer layer against drastic volume changes of silicon during the charge-discharge cycling, consequently leading to the retardation of the capacity fade of intrinsic silicon materials. By varying the thickness and porosity of encapsulated oxide layer, the electrochemical performance of silicon nanocomposites as an anode material was characterized by X-ray diffraction (XRD), electrochemical voltage spectroscopy (EVS), transmission electron microscope (TEM), galvanostatic charge-discharge experiments.