Synthesis and electrochemical properties of Si/PEDOT anode materials

주동혁[1,2], 박석환[1,2], 정홍련[1,2], 이완진[1,2,*]
[1]전남대학교 BK21 기능성 나노 신화학 소재 사업단;
[2]전남대학교 신화학소재공학과, Alan MacDiarmid Energy Research Institute,
Chonnam National University
(wjlee@jnu.ac.kr*)

The carbonaceous materials as anode for lithium secondary batteries are widely used because of their excellent durability. However, low energy density of the material is main problem in application at bigger and more powerful devices. This study focused on enhancing performances of metal-conducting polymer composite anode. Si(0)/Poly(3,4-ethylenedioxythio-phene)(PEDOT) nanocomeposites were prepared by in-situ oxidative polymerization. To prepare these nanocomposites, Si(IV) metals were reduced as state of Si (0) by using sodium hydride as a metal reducing agent, and stabilized by t-BuOH stabilizer in the mixed solution. Si(0)/PEDOT nanocomposite was obtained by polymerizing to drop EDOT monomer into above mixed solution and to add cerium sulfate as an oxidant afterward. This process indicates on how well metal nanoparticles distribute to the polymer chain. Three nanocomposites samples were prepared as 100:0, 70:30, and 70:30 according to the ratio of Si(0) to PEDOT by weight percent. Si(0) nanoparticles in the nanocomposites were not only well-reduced as neutral state but also well-distributed in polymer chain.