Improvement of Cycling Performance of Lithium-Ion Batteries by Coating Graphite Anodes with Ionic Ceramic Particles

박영남, 김동원*
한양대학교
(dongwonkim@hanyang.ac.kr*)

Lithium-ion batteries have rapidly become the dominant power source for portable electronic devices, electric vehicles and energy storage systems due to their high energy density and long cycle life. It is well known that a solid electrolyte interphase (SEI) layer is formed at the surface of the graphite electrode during the intial cycles in lithium-ion batteries. The SEI layer originates from the reductive decomposition of the electrolyte solvent and salt on the graphite electrode. The chemical nature and morphology of the SEI layer play an important role for determining battery performance such as cycle life, rate capability and safety. Many studies have been focused on the use of electrolyte additive such as vinylene carbonate for forming a stable SEI layer on the negative electrode. In this work, we tried to modify the graphite electrodes without adding any additives in order to form stable SEI layer. It could be achieved by coating the ionic ceramic particles containing lithium ions onto the graphite electrodes. The lithium-ion batteries are assembled with surface-modified graphite electrodes and their cycling performances are evaluated.