Silicon-Carbon Deposition on a Carbon Paper Current Collector for Li- Ion Battery Anode with Ultra-High Overall Capacity

윤태균, 조미경, 채창주, 이정규*
동아대학교
(jklee88@dau.ac.kr*)

Silicon-carbon anode on carbon paper current collector is reported here for lithium-ion batteries. The silicon-carbon anode was prepared by carbonizing resorcinol-formaldehyde gel containing Si nanoparticles directly deposited on a carbon paper. To achieve high anodic capacity, silicon is an excellent material because of its high theoretical capacity. However, Si-based anodes suffer from poor cyclability due to drastic Si volume expansion/contraction during lithiation/delithiation. Silicon-carbon composite can effectively accommodate the Si volume change. To enhance the overall energy density of the Si-C anodes, the Cu current collector should be replaced by a lightweight current collector with physicochemical, thermal and electrical properties similar to that of the active materials. Silicon-RF polymer precursor was incorporated into a carbon paper current collector, followed by carbonization, to directly form a Si-C electrode. The entire electrode was synthesized using a one-pot carbonization process. The ultra-high overall capacity, cycling stability evidencing improved structural integrity of thus prepared electrode will be presented compared to the conventionally prepared electrode.