Performance Degradation of Si-rGO Anode for Lithium-ion Battery as Coating Types of rGO Nanoflakes

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Lithium-ion battery (LIB) have been gathered vigorous attention along to progress of portable electronic devices and needs to use eco-friendly energy. Among various challenging aspects for versatile utilization of LIB, it is the most requested point to increase the energy density of LIB which could be achieved to be stored in LIB. In the aspect for solution of this challenge, silicon has been considered as next-generational anode material owing to its high capacity. Although Si has diverse advantages for application to anode of LIB, Si also indicates performance degradation due to its poor electrical/ionic conductivity and large volume expansion during repeated charge and discharge cycle. Herein, we designed three types of Si@GO models depending on the size of graphene layer area and synthetic method. After lithium-ion battery half-cell 100cyc performance, Si@GO core-shell model excel the best capacity retention and coulombic efficiency. Alloying type anode active material such as silicon can be stabilized through graphene nanoflake core-shell modelling.