Optimizing Morphology of Si Produced from Various SiO_2 Particles by Mg Reduction

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Silicon (Si) is one of most promising anode material for lithium ion batteries because of its high capacity (4200 mAh/g) and abundance. However, the huge volume expansion during charge and discharge process causes cell pulverization, delamination from a current collector and thicker SEI layer formation, which eventually induce capacity fading and instability. To prevent volume expansion, numerous strategies has been suggested; for instance, porous structure, hollow structure, or nanoparticle. One of the most promising techniques to produce Si particles are reduction of silicon dioxide (SiO_2). However, it is not clear yet which morphology of SiO_2 is the most optimized one for the production of Si with enhanced electrochemical performance. Herein, we tested various types of SiO_2 particles with different morphologies. The SiO_2 particles were reduced using a modified magnesium reduction method. The produced Si particles exhibited a porous structure, which could retard the volume expansion during charge and discharge process. The effect of the modified Mg reduction of various types of SiO_2 particles on the electrochemical performance of the produced Si particles will be discussed.

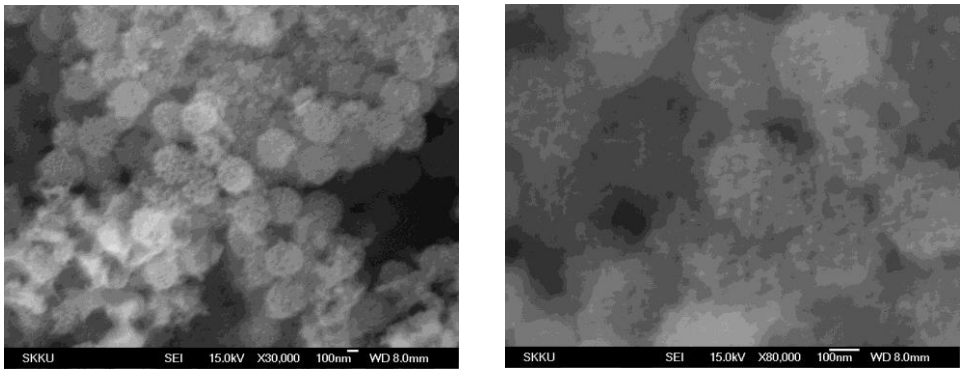

Figure 1. Spere shape Si particle

References:
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