Silicon electrode based on steel use stainless microfiber current collector for lithium-ion batteries

Seonghyun Song[1], Dong Jin Lee[2], Myungwon Seo[1] and Yong Min Lee[1,*]

[1]Department of Chemical and Biological Engineering, Hanbat National Univ., 125 Dongseo-daero, Yuseong-gu, Daejeon, 305-719, Korea
[2]Department of Chemical and Biomolecular Engineering, Korea Advanced Institute of Science and Technology (KAIST), 291 Daehak-ro, Yuseong-gu, Daejeon 305-701, Korea

* yongmin.lee@hanbat.ac.kr, +82-42-821-1549

Silicon (Si) has attracted much attention as a promising anode material for high energy density lithium-ion batteries (LIBs) due to its highest theoretical capacity (4200mAh/g). However, low electric conductivity and large volume change during cycling results in very short cycle property. Various nanosized or nanostructured Si materials, whose electrochemical performances are significantly better than those of micron-sized Si materials, have been proposed to address this problem [1-3]. However, unfortunately, they cannot fulfill the minimum cycle requirement for LIB anode materials.

In this work, we newly design Si electrode based on steel use stainless (SUS) microfiber, which can also function as a three-dimensional current collector, by RF sputtering. By optimizing sputtering time and power, the optimized Si thickness and morphology are characterized by SEM and TEM. And then, the electrochemical properties are evaluated by coin half cells for rate capability and cycle life.

References

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