

Preparation of Nanostructured Materials using Salt Powder as Separation Medium for Electrochemical Energy Storage Devices

Yuanzhe Piao*

*Graduate School of Convergence Science and Technology, Seoul National University,
Republic of Korea*

Email: parkat9@snu.ac.kr

Simple and scalable method for the synthesis of nanostructured material using salt powder as separation medium is reported[1,2]. The composite material decorated with self-assembled and monodispersed metal oxide nanoparticles was prepared simultaneously through a solventless procedure using a single precursor for both carbon and metal oxide.[1] The 2-D nanostructured material was obtained and the shape and size of the nanoparticles decorated on carbon could be easily controlled by changing the experimental conditions. The composite material was characterized by using scanning electron microscopy, transmission electron microscopy and X-ray diffraction.

As a demonstration of the nanocomposite as anode material for Li-ion battery, electrochemical experiments were carried out in a coin type cell assembly. Transmission electron microscopy measurements were made on the nanocomposite electrodes after charge/discharge cycling to investigate the mechanical deformation during the electrochemical cycling. The as-prepared nanostructured material showed excellent rate performance and cycling stability as anode material for Li-ion batteries. The superior performance of the nanomaterial is due to its short diffusion path and large accessible surface area for the effective insertion of lithium ions.

References

- [1] Byungchul Jang, Mihyun Park, Oh B. Chae, Sangjin Park, Youngjin Kim, Seung M. Oh, Yuanzhe Piao*, Taeghwan Hyeon*, Journal of the American Chemical Society, 2012, 134, 15010-15015.
- [2] Taejin Hwang, Jeongyeon Lee, Jiseop Oh, Jong Min Kim, Youngmoo Jeon, Seung-Keun Park, Yuanzhe Piao*, Electrochimica Acta, 2019, 319, 596-605.