Vertically grown MoS_2 anode for high-performance sodium-ion batteries

정종엽, 박종혁†
연세대학교
(lutts@yonsei.ac.kr†)

Lithium-ion battery (LIB) has been a tremendous success for decades. As the demand for rechargeable batteries surges, a need has arisen for low-cost secondary batteries. Among various studies, sodium-ion battery (SIB) is the most promising secondary batteries due to its similar working principles and the abundance of sodium in the natural world. Among many anode materials for SIB, MoS_2 has attracted attention because it can intercalate sodium ions in its layered structure. However, in the repeated intercalation of Na+ , MoS_2 suffers from collapse of its layered structure.
Herein, we present vertically grown MoS2 on nitrogenous reduced graphene oxides (N-RGO) with controlled sheet density and height of MoS2 sheets as SIB anode active material. The MoS_2 materials are synthesized by gel-precursor based method. By adjusting the nucleation and growth processes, we controlled the height and density of MoS2 sheets to find optimal condition that show great performance and high stability. Control of the partial geometry can achieve these improved property because the high sheet density can prevent additional SEI layer and the shortened sheet length reduces the resistance of Na^+ diffusion.