

Carbon coated ordered mesoporous SnO₂ anode materials for lithium ion battery

박귀옥, 김지만*, 손정국¹, 김한수¹, 장윤정
성균관대학교; ¹삼성종합기술원
(jimankim@skku.edu*)

Lithium ion battery is considered the most promising energy storage technology for mobile electronics, electric vehicles and renewable energy system. Mesoporous anode material that consists of particles containing nano-size pores separated by walls of similar size can deliver high rate power and high stability on cycling. In this report, we present simple and generic concept involving metal oxide with carbon species as stable and high capacity anode materials for Li ion battery. Specifically, highly ordered mesoporous SnO₂ anode material with bicontinuous *Ia3d* meso-porous structure for lithium ion battery was prepared using KIT-6 silica template via nano-replication method. Carbon coated mesoporous SnO₂ is easily synthesized through a dehydration reaction between carbon precursor and surface hydroxyl group in mesoporous SnO₂. Remaining carbon species are in the range of 2.5-12 wt%, which not only accommodate a volume change of SnO₂ also prevent aggregation of electrode resulting in a dramatic reduction in capacity fading after prolonged charging-discharging cycles. The tools for this study included electron microscopy (SEM and TEM), XRD and standard electrochemical techniques.