

### Highly Ordered Mesoporous Antimony-Doped SnO<sub>2</sub> for lithium ion battery electrode

형은별, 박귀옥, 김지만\*  
성균관대학교  
(jimankim@skku.edu\*)

Highly Ordered Mesoporous Sb-doped SnO<sub>2</sub> nanopowders (ATO) were prepared by nano-replication method which is using silica template with simple reagents (SnCl<sub>4</sub> and SbCl<sub>3</sub>). The doping level of Sb in the mesoporous SnO<sub>2</sub> could be varied by the experimental conditions. The synthesized mesoporous ATO has high specific surface areas about 90-120 m<sup>2</sup>/g (calculated by BET equation) and pore size of ~18 nm (calculated by BJH equation). Synthesized samples were analyzed by powder X-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDX), transmission electron micrographs (TEM), N<sub>2</sub> adsorption-desorption isotherms, Sheet resistance and X-ray photoelectron spectroscopy (XPS). The prepared samples were tested as anode material for lithium-ion batteries, whose charge-discharge properties, cyclic voltammetry, and cycle performance were examined. The results showed that ATO 5% sample has a high initial discharge capacity of 1103 mAhg<sup>-1</sup> and best cycle performance in a potential range of 0.01-3.0V was achieved. The cycle performance is improved due to mesoporous structure and doped Sb particles can perform as a better matrix during Li alloying/de-alloying.