

Crab shell as sustainable templates encapsulating SnO<sub>2</sub> for lithium-ion batteries

손승연, 김일태<sup>†</sup>

가천대학교

(itkim@gachon.ac.kr<sup>†</sup>)

Recent researches developing lithium-ion batteries (LIBs) with high capacity and energy density have received the most attention to satisfy the urgent needs for portable electronic devices, electrical vehicles, and large-scale energy storage systems. As a high-theoretical-capacity (782 mAh g<sup>-1</sup>) and low-cost material, SnO<sub>2</sub> has attracted intense interest as an anode for LIBs. Despite intensive study, the use of SnO<sub>2</sub>-based anode is restricted because of their poor conductivity and a volume change of ~300% during (de)lithiation. Regarding these difficulties, we attempted the use of crab shells as a sustainable biotemplate to solve problems related to the large volume change of SnO<sub>2</sub>-based anode materials and poor conductivity. Here, we show that the unique structure of crab shells can be changed as hollow carbon channels, and how to use these channels as an anode material. Furthermore, different morphologies, characteristics, and electrochemical performances of SnO<sub>2</sub>-crab shell electrodes are discussed depending on different reaction times and temperatures.