Hierarchical transition metal yolk-shell microsphere grafted with N-doped carbon nanotubes as cathode host for lithium-sulfur batteries

박승근, 강윤찬†
고려대학교 신소재공학부
(yckang@korea.ac.kr†)

Lithium-sulfur (Li-S) batteries have been considered to be a potential energy storage system to substitute commercial lithium ion batteries due to their high theoretical specific capacity (1675 mA h g^{-1}), low cost, and environment friendly. However, the low electrical conductivity of sulfur element and the high solubility of polysulfides in organic electrolyte result in rapid capacity fading during cycling. Thus, it is a challenge to develop rationally designed cathode host to effectively confine sulfur element.

In this presentation, we introduce a novel method for preparation of hierarchical transition metal yolk-shell microsphere grafted with N-doped carbon nanotubes, in which Co element is selected as the first target material. The Co_3O_4-MgO yolk-shell microsphere synthesized by one-step spray-pyrolysis is used as precursor material. Subsequent post thermal-treatment of the precursor produces the Co@N-doped CNT yolk-shell microsphere. After sulfur loading, the electrochemical properties of the microsphere, as cathode material for Li-S batteries, are evaluated in detail.