High Performance Li-S Battery Cathodes Based on Novel Sulfur-Loading Method and Carbon-Modified Separator

이정규†, 오창일, 안성현
동아대학교
(jklee88@dau.ac.kr†)

Recently, much interest has been paid to the development of high-energy storage devices for portable electronics, electric vehicles, and large energy storage systems. Thus, lithium-sulfur (Li-S) batteries have attracted a great attention because sulfur is abundant and has high theoretical and energy density when coupled with metallic lithium anode. However, it has been a big challenge to device Li-S batteries offering a long cycle life at high sulfur loading amount in the form of S/C composites in electrode level as well as in active material level. The dissolution of lithium polysulfides (LPS) into the electrolyte and their shuttle effects have to be effectively suppressed since they cause poor capacity retention and low coulombic efficiency In this study, we synthesized mesoporous carbons (MCs) and N-doped mesoporous carbon (N-MC) as the sulfur host materials. By employing a novel sulfur-loading method which gives high sulfur dispersion, and carbon coated separators (CCS), the electrochemical performances of Li-S battery system were much improved in terms of capacity, rate capability and cycle life owing to effective suppression of LPS shuttle.