

Lithium-metal Free Li-ion Sulfur Full Batteries with a Hybrid Sulfur Cathode and a Lithiated Si/SiO_x Nanosphere Based Anodes

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The lithium-sulfur battery is one of the most promising high-energy-density electrochemical energy storage system. However, many drawbacks (the insulating nature of sulfur, formation of soluble lithium polysulfide, lithium metal problem etc.) restrict a possibility of lithium-sulfur battery commercialization. Herein, we demonstrated a lithium-ion sulfur cell configuration using a newly designed hybrid sulfur cathode and a lithiate Si/SiO_x nanosphere anode with optimized liquid electrolyte. The full lithium-ion sulfur battery presented herein delivered a capacity on the order of about 750mAh g⁻¹. We believe that these results might advance the practical development of the lithium-ion sulfur battery, particularly for use in emerging markets including electric vehicles and large-scale power storage systems for use with renewable energy systems.