

Lithium Battery Using Porous Carbon/Sulfur Composite Cathode

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Sulfur (S) has many valuable characteristics, such as a low equivalent weight, extremely low cost, and nontoxicity. In a Li-S cell, the potential corresponds to 1/2 ~ 2/3 of the potential exhibited by a typical positive electrode for a Li-ion cell (3.2 V ~ 4.2 V). However, this low potential is outweighed by the 1672 mA h g⁻¹ theoretical specific capacity, which is the highest of all known solid cathode materials. To improve the electrochemical performance of Li-S rechargeable batteries, tunable porous carbon materials, which are known as carbide-derived carbons (CDCs), are employed as adsorbents and conductive matrices for the cathodic sulfur materials. A new assembly for Li-S cells was developed by introducing multi-layer membranes as separators. The utilization of the multi-layer membranes enables the minimization of the shuttle effect by expanding the distance between the separators and blocking the penetration of the polysulfide.