

High Mass-Loading Sulfur-Composite Cathode for Lithium-Sulfur Batteries

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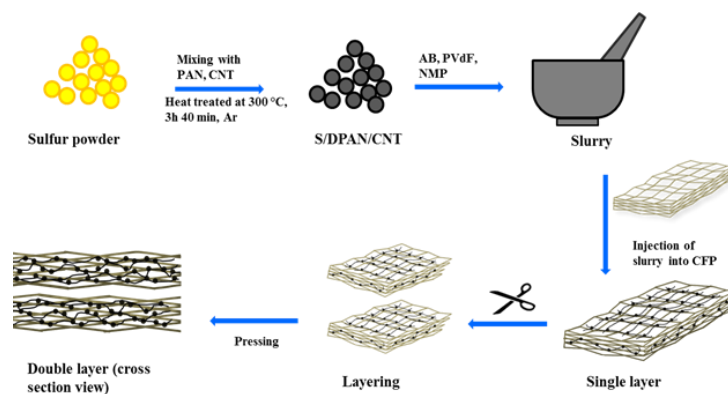


Fig. 1 A schematic representation illustrating the preparation and injection process of sulfur composites into 3D current collector

Lithium-sulfur batteries potentially can be applied in the market of portable devices and storage of electrical energy, due to the cheap and abundant resources and high theoretical discharge capacity of sulfur (1675 mAh g⁻¹). Nevertheless, implementing Li-S batteries face several difficulties based on low electronic conductivity of sulfur and complicated electrochemical reaction. This research is aimed to increase mass loading of sulfur in the composite, which in turn requires improvement in the electrical conductivity. The conductivity of sulfur is improved with the synthesis S/DPAN/CNT composite from polyacrylonitrile (PAN) and carbon nanotubes (CNT), while mass loading is increased with the use of carbon fiber paper as a current collector. Herein we report a simple and efficient preparation way of the sulfur composite cathode with the increased sulfur mass loading and stable electrochemical properties. As a result, mass loading of sulfur was increased up to 5 mg cm⁻² and batteries showed stable electrochemical performance.

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