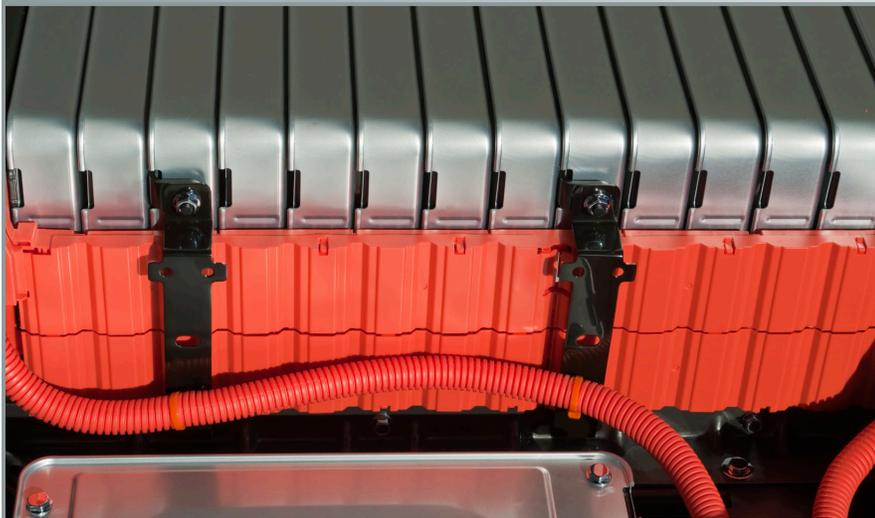


# Lithium/Sulfur Batteries Based on Doped Mesoporous Carbon

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## Technology Summary

A sulfur/carbon composite material was prepared by heat treatment of doped mesoporous carbon and elemental sulfur at a temperature inside a stainless steel vessel, which was used in lithium/sulfur batteries that were tested in electrolytes. At 25 C and under a current density of 84mA g<sup>-1</sup>, the battery based on one embodiment of the invention showed an initial discharge capacity of 460mAh g<sup>-1</sup> and a reversible cycling capacity of 350mAh g<sup>-1</sup>, while the one based on another embodiment of the invention exhibited an initial discharge capacity of 549mAh g<sup>-1</sup> and a reversible cycling capacity of 544mAh g<sup>-1</sup>. At 50 C, the initial discharge capacities were improved significantly. For example, under a current density of 194 mA g<sup>-1</sup> the initial discharge capacities of the batteries based on the above referenced embodiments increased to 1176 and 1298 mAh g<sup>-1</sup>, respectively. In addition, at 50 C the batteries showed good cycling performance and rate capability.

## Advantages

- Doped mesoporous carbon has catalytic effect on sulfur reduction and offers higher discharge voltage and higher capacity than activated carbon (AC)
- Use of electrolytes is safer and more environmentally benign
- Electrolytes have good stability towards polysulfides
- Good capacity retention at 25 C
- Increased rate tolerance with higher temperatures

## Potential Applications

- Batteries, including batteries for electric vehicles

## Patent

Application in preparation

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