A Room-temperature High-energy-density Solution

VTIP 20-037: "A High-Energy-Density Na/S Battery"

THE CHALLENGE

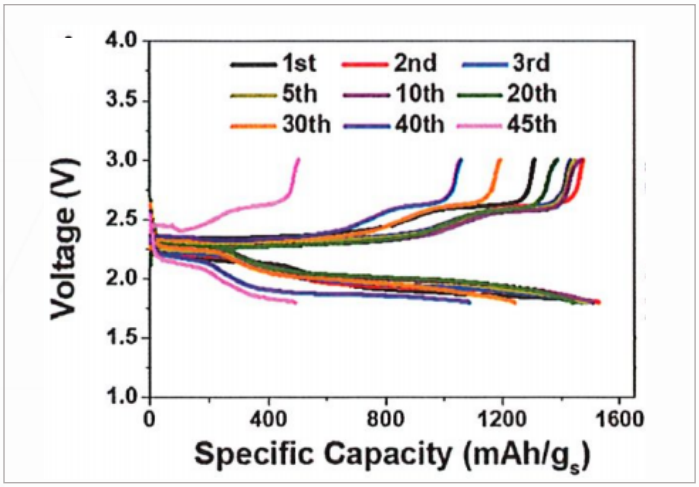
Currently, high-energy-density solutions at an affordable cost are needed for any renewable energy technology to succeed, and unfortunately most current-generation high-density solutions need high room temperatures to operate. High specific capacities even after repeated usage is also critical for cyclic performance of high-energy-density solutions.

OUR SOLUTION

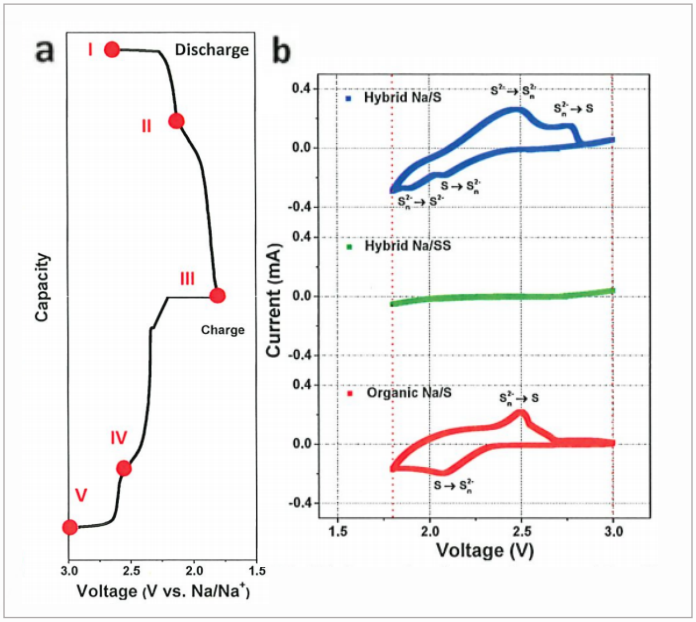
Zheng Li and team have created a room-temperature Na/S battery with a hybrid electrolyte that has a higher specific capacity and a higher average cell voltage than any reported Na/S batteries to date.

The fact that the battery is made with affordable substances such as sodium and sulfur allows it to be an ideal candidate for low-cost high-density batteries for large-scale energy storage and electric vehicles. The stability in cyclic behavior and high reversible capacity also make it ideal for electric vehicles.

Since it operates closer to the theoretical maximum of Na/S batteries, it performs optimally and can store large amounts of energy while operating at room temperature.



Cycling Voltage Profiles of Hybrid Na/S cell at 50-50 vol% TEGDME-H_2O.



(a) Initial discharge-charge behavior of the hybrid Na/S cell at a current density of 200 mA/g with a voltage cut off of 1.8V.

(b) Cyclic voltammogram comparison between hybrid Na/SS. Hybrid and organic Na/S batteries with a scan rate of 0.5 mV/s at the range between 1.8 and 3.0V.

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