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A Janus Separator for Inhibiting Shuttle Effect and Lithium Dendrite in Lithium–Sulfur Batteries


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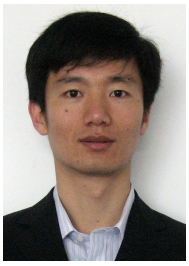
Zhenhua Sun


Feng Li

Invited for this month's cover picture is the group of Feng Li and Zhenhua Sun. The cover picture shows a conceptualized lithium–sulfur battery assembled with a Janus separator based on $La_2Zr_2O_{7-x}$ nanotubes with surface oxygen vacancies, in which the shuttle behavior of polysulfide is blocked by adsorption and catalysis effects, and uniform lithium (Li) deposition is achieved by fast free Li^+ transfer. Learn more about the story behind the research featured on the front cover in this issue's Cover Profile. Read the full text of the Research Article at 10.1002/batt.202100389.

What is the most significant result of this study?

We designed a Janus separator for lithium–sulfur batteries to tackle the issues of both cathode and anode by reasonably selecting, constructing, and decorating materials (OV–LZO).

What are the main challenges in the broad area of your research?

The main challenge in the process of scientific research is how to integrate with industrial production and realize the practical application of our technology.

What is in your opinion an upcoming research theme likely to become one of the 'hot topics' in the near future?

Organic electrode materials may become one of the 'hot topics' in the near future. The substitution of conventional metals as redox-active material by organic materials offers new possibilities for high energy/power density, cost effective and environmentally friendly rechargeable lithium batteries.

What other topics are you working on at the moment?

We are also working on organosulfur–polymer cathode, lithium metal anode, polymer-based solid-state electrolyte and solid-state lithium–sulfur battery and are committed to developing a more advanced energy storage system.