

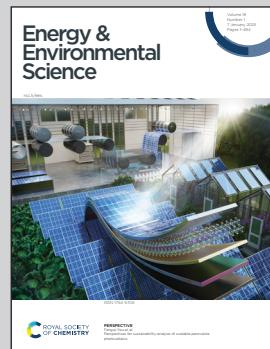


Showcasing research from Professor Yanjiao Ma's laboratory, Nanjing Normal University, Nanjing, China.

Improving upon rechargeable battery technologies: on the role of high-entropy effects

This review presents six groundbreaking effects of high-entropy battery materials, offering insights into their unique contributions to structural stability, ion diffusion, and cycling performance. By extending the traditional four effects of high-entropy materials, it explores how these advantages improve electrochemical properties, such as enhanced redox activity and suppressed phase transitions. Additionally, the review discusses key challenges in synthesizing and designing high-entropy systems, including element selection and defect engineering. Forward-looking perspectives and future research directions are proposed, aiming to inspire innovative advancements in battery materials and electrochemical energy storage technologies.

As featured in:



See Yuan Ma, Yuping Wu,
Yanjiao Ma *et al.*,
Energy Environ. Sci., 2025, **18**, 19.