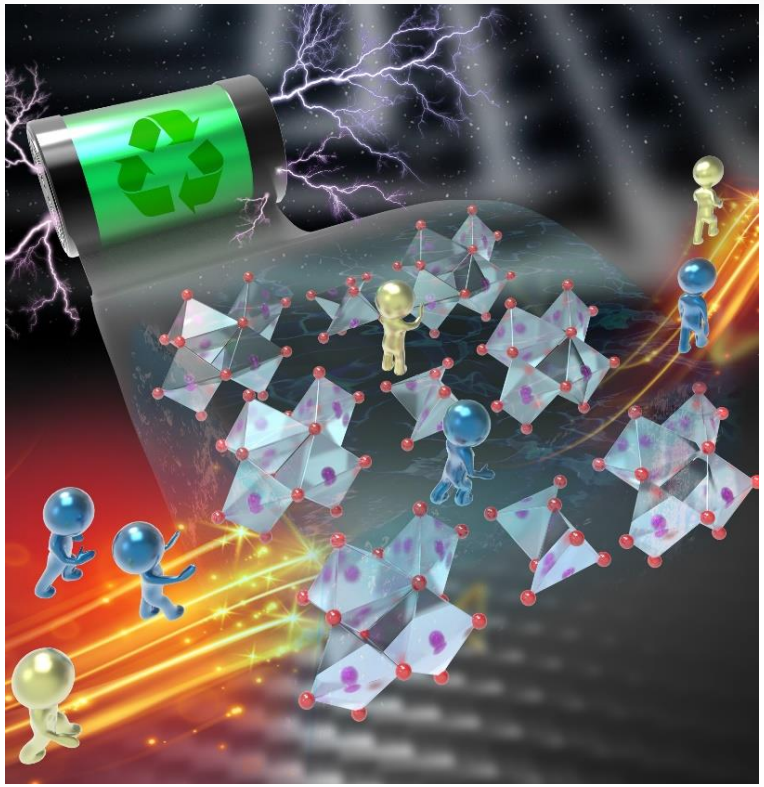
Dual-Ion Transport in a Promising Aqueous Battery



The illustration shows the dual-ion sequential storage mechanism (yellow and blue) within the structure of a sodium vanadate cathode.
Image credit: Xiaoqiang Shan, Xiaowei Teng.

Scientific Achievement

Scientists revealed the mechanism of dual-ion sequential storage in a sodium vanadate cathode material for a zinc-ion battery (ZIB).

Significance and Impact

ZIBs are a promising technology for stationary, aqueous energy storage. Fully realizing this promise requires a fundamental understanding of the dual-ion sequential storage mechanism, which was given a quantitative description in this work.

Research Details

- Synthesized a layered sodium vanadate cathode.
- Characterized the cathode with electrochemical studies, *in operando* studies at the PDF beamline, and x-ray studies at the BMM beamline at NSLS-II.
- Investigated the structural evolution during cycling.
- Revealed a dual-ion transport mechanism that offers high battery capacity and energy density.
- Showed good cycling life with 78% of retention after 2000 cycles.

X. Shan, S.W. Kim, A. M. M. Abeykoon, G. Kwon, D. Olds, X. Teng. *ACS Applied Materials & Interfaces* **12** (49), 54627-54636 (2020).

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