Organoaluminum Flow Battery Analytes

Tech ID: 33433 / UC Case 2022-603-0

ABSTRACT

Researchers at the University of California, Davis, have developed an improved redox flow battery (RFB) for intermittent renewable energy applications such as wind, solar, and tidal. The device provides high-density energy storage and transfer without losing capacity over time and frequent replacement as with traditional lithium batteries.

FULL DESCRIPTION

Intermittent energy generated from renewable sources like solar, wind, tidal, and waves produces energy when it is not needed; therefore, it must be stored in batteries for future use. Redox flow batteries (RFBs) are an emerging solution for storing intermittent energy on a large scale due to their long lifetimes, high energy densities, and scalability. RFBs utilize the potential difference between a set of redox couples, typically solution-based, to interconvert chemical and electrical energy via reduction and oxidation at the respective electrodes. However, current technology generally relies on vanadium, which has low energy density due to small voltage cells and low solubility.

Researchers at the University of California, Davis, have developed a new class of RFBs that use a non-aqueous electrolyte solution for the negative and positive compartments, with a separator comprising a Ferrocene (Fc)-substituted organometallic complex. Fc-substituted organometallic complexes offer more electron transfer via organic ligands. The construction of their RFBs enables multi-electron charge carriers to enhance energy density, storage, and transfer.

APPLICATIONS

- Energy storage and transfer for intermittent power generation.

FEATURES/BENEFITS

- A high-density RFB that can store more energy and facilitate efficient transfer compared to traditional RFB designs.
- Scalable for extensive renewable energy generation facilities
- They have longer lifespan than lithium-ion batteries and do not lose capacity over time.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12258358	03/25/2025	2022-603

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Aluminum-mediated Base-free Catalysis for Transfer Hydrogenation

CONTACT

Victor Haroldsen
haroldsen@ucdavis.edu
tel: 530-752-7717.

INVENTORS

- Berben, Louise A.

OTHER INFORMATION

KEYWORDS

energy, batteries, lithium, RFB, renewable energy, energy storage/transfer, wind, solar, tidal, intermittent energy generation

CATEGORIZED AS

- **Energy**
  - Other
  - Solar
  - Storage/Battery
  - Wind

RELATED CASES

2022-603-0

- Group 13 Metals as Anolytes in Non-Aqueous, Redox Flow Batteries
- Electrolyte Formulations for Non-Aqueous Flow Batteries

University of California, Davis
Technology Transfer Office
1 Shields Avenue, Mrak Hall 4th Floor,
Davis,CA 95616

Tel:
530.754.8649
techtransfer@ucdavis.edu
https://research.ucdavis.edu/technology-transfer/
Fax:
530.754.7620

© 2024 - 2025, The Regents of the University of California
Terms of use
Privacy Notice