SYMMETRIC, AIR-TOLERANT AND MEMBRANELESS ALL ORGANIC FLOW BATTERIES

Tech ID: 34141 / UC Case 2025-180-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Grid-scale energy storage systems are currently hindered by the high capital costs of ion-selective membranes, the toxicity of metal-based electrolytes, and the requirement for strictly anaerobic environments. Researchers at UC Berkeley have developed a symmetric, air-tolerant, and membraneless all-organic flow battery utilizing a novel electrolyte that eliminates the need for expensive membranes and complex air-exclusion hardware by employing a single organic compound that functions as both the positive and negative active material. The resulting battery technology provides a highly scalable, low-cost, and sustainable energy storage solution that maintains high efficiency and chemical stability under ambient conditions.

SUGGESTED USES

- Renewable energy integration for utility-scale solar and wind farms.
- Long-duration energy storage for industrial microgrids and backup power systems.
- Commercial peak-shaving and load-leveling for large facilities.
- Remote power storage for off-grid telecommunications and rural communities.
- Large-capacity energy arbitrage for grid stabilization.

ADVANTAGES

- Membraneless architecture significantly reduces stack manufacturing costs and simplifies maintenance.
- Air-tolerance allows for operation in ambient conditions, eliminating the need for expensive inert gas blanketing.

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INVENTORS

- Toste, Francisco D.

OTHER INFORMATION

CATEGORIZED AS

- **Energy**
  - Storage/Battery
- **Materials & Chemicals**
  - Chemicals
  - Storage

RELATED CASES

2025-180-0

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Symmetric design inherently prevents cross-contamination and simplifies electrolyte management and reclamation.

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All-organic chemistry utilizes earth-abundant materials, ensuring a sustainable and metal-free supply chain.

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Simplified system to reduce overall footprint and operational complexity.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Bioinspired Oxidative Cyclization Reagents For Chemoselective Tryptophan Bioconjugation
- Redox-Based Reagents For Methionine Bioconjugation
- Asymetric Electrophilic Fluorination Using An Anionic Chiral Phasee-Transfer Catalyst
- pH Signaling and Regulation in Pyridinium Redox Flow Batteries

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