PH SIGNALING AND REGULATION IN PYRIDINIUM REDOX FLOW BATTERIES

Tech ID: 34346 / UC Case 2026-059-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

The implementation of cost-effective and reliable energy storage solutions, such as redox flow batteries, is often hindered by the complexity and expense of accurately monitoring their state of charge (SOC) and state of health (SOH). To address this, a novel approach using low-cost management systems and methods has been developed for electrochemical cells based on viologen, particularly pyridinium redox flow batteries. This innovation centers on pH signaling and regulation to enable real-time SOC and SOH monitoring. The viologen species' electrochemical processes naturally induce localized pH changes, and by monitoring and regulating the pH within the cell, researchers can obtain immediate, actionable data on the battery's operating condition. This pH-based system offers a simple, integrated, and economical alternative to conventional, often more complex, monitoring techniques.

SUGGESTED USES

- Real-time state of charge (SOC) monitoring in pyridinium redox flow batteries
- Real-time state of health (SOH) monitoring in pyridinium redox flow batteries
- Low cost management systems for viologen-based electrochemical cells
- pH regulation methods for optimizing pyridinium electrochemical cell performance

ADVANTAGES

- Low-cost management systems and methods
- Enables real-time state of charge (SOC) monitoring
- Enables real-time state of health (SOH) monitoring
- Utilizes a simple pH signaling mechanism
- Applicable to pyridinium redox flow batteries and other viologen-based electrochemical cells

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

- **Energy**
  - Other
  - Storage/Battery
- **Engineering**
  - Engineering
  - Other
- **Sensors & Instrumentation**
  - Analytical
  - Biosensors
  - Physical Measurement
  - Process Control
  - Scientific/Research

RELATED CASES

2026-059-0

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
- Symmetric, Air-Tolerant And Membraneless All Organic Flow Batteries

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