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

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ABSTRACT

Researchers at the University of California, Davis have identified earth abundant and other relatively inexpensive materials that form the basis of novel molecules (anolytes), with long lifecycles and high energy densities, to be used in redox flow batteries.

FULL DESCRIPTION

Energy storage via battery technology is a fundamental requirement to scale renewable electricity into wider use. Current battery technologies have multiple limitations – ranging from relatively low energy densities to safety concerns to their overall, full lifecycle, environmental impacts. Redox flow batteries (RFBs), which enjoy long lifetimes and comparably safe operating profiles, have some limitations of their own including cost of analyte materials, which need to be resolved before RFBs are deployed at scale across increasingly diverse applications.

Researchers at the University of California, Davis have developed novel anolyte molecules for RFBs. Unlike all-organic or organometallic anolytes being explored for RFB battery technology, the use of "Group 13" metal anolytes in this technology provide improved chemical stability, high solubility, and greater likelihood that the RFBs that use these molecules will possess higher energy storage capacities under a wider range of temperature conditions.

APPLICATIONS

- Commercial and industrial-scale solution for storing energy
- Compatible with renewable power generation

FEATURES/BENEFITS

- Battery is produced from abundant earth and other, relatively low cost materials.
- Raw materials including Al are available from domestic sources.
- Long lifetimes, safe operation, and high energy density relative to many other commercial battery options
- Wider operating temperature range
- Potential near "drop-in" replacement

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20230317967	10/05/2023	2021-611
Patent Cooperation Treaty	Published Application	WO 2022/056272	03/17/2022	2021-611

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Organoaluminum Flow Battery Analytes

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OTHER INFORMATION

KEYWORDS

Non-aqueous, NRFB, RFB,

Anolyte, Group 13 metals,

Redox flow battery

CATEGORIZED AS

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

RELATED CASES

2021-611-0

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