Low-Cost Liquid Electrolytes For Room-Temperature Fluoride Ion Batteries

Tech ID: 33960 / UC Case 2024-99B-0

BRIEF DESCRIPTION

This invention introduces a groundbreaking liquid electrolyte for fluoride-ion batteries, offering high electrochemical stability, superior ionic conductivity, and excellent thermal stability.

FULL DESCRIPTION

The disclosed technology pertains to a novel class of liquid electrolytes designed for use in fluoride-ion batteries (FIBs). These electrolytes demonstrate an unprecedented electrochemical stability window of above 11 V, ionic conductivity greater than 3 mS/cm, and thermal stability up to 200°C. Comprising commonly available and inexpensive industrial chemicals, the electrolytes can be based on organic, aqueous, or aqueous-organic systems, including the salt, solvent, and diluent components.

SUGGESTED USES

- Manufacturing of fluoride-ion batteries for consumer electronics.
- Energy storage solutions for renewable energy systems.
- Electric vehicles requiring high energy density and thermal stability.
- Portable power sources with enhanced safety and lower environmental impact.

ADVANTAGES

- Extended electrochemical stability window of above 11 V, enabling broader application in high-voltage systems.
- Superior ionic conductivity (> 3 mS/cm), facilitating efficient charge transport.
- Excellent thermal stability up to 200°C, ensuring performance under extreme conditions.
- Cost-effective production from commonly available industrial chemicals.
- Compatibility with both organic and aqueous systems, offering flexibility in battery design.

PATENT STATUS

Patent Pending

RELATED MATERIALS

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OTHER INFORMATION

KEYWORDS

fluoride-ion batteries, liquid electrolytes, organic electrolytes, organic-aqueous electrolytes, localized high-concentration electrolytes, room-temperature batteries, portable electronics, electric vehicles

CATEGORIZED AS

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

RELATED CASES

» Peichao Zou, Chunyang Wang, Yubin He, Huolin L. Xin, and Ruoqian Lin. A Water-in-Salt Electrolyte for Room-Temperature Fluoride-Ion Batteries Based on a Hydrophobic–Hydrophilic Salt. Nano Letters 2024 24 (18), 5429-5435. DOI: 10.1021/acs.nanolett.4c00244

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