

## Technology Overview

This invention relates to a series of new solvents and/or additives, most of which have unsaturated functionalities. They may serve to form excellent interphase chemistry at either cathode or anode surface or both.

- Unsaturated sulfones, sulfonates, carboxylic and carbonate esters were synthesized and characterized as electrolyte solvents, co-solvents and additives
- Some of these chemicals serve as SEI-forming agent on the anode surface
- Some of these chemicals can stabilize electrolyte/cathode interface at high potentials in “5-volt” region
- A few even can work simultaneously at both anode and cathode surfaces
- The electrolytes based on these chemical compounds benefit Li-ion batteries in terms of longer service life, high stability at elevated temperatures and better safety

## New Solvent Structures and Characterization

Solvent	Structure
MPC	
DME	
DVE	
GCMC	
EVC	
MAC	
MVC	

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## Technology Advantages

- Interphases are key components determining the service life and stability of Li-ion batteries
- Electrolyte additive approach is advantageous in terms of cost and simplicity
  - Does not require infrastructural investment
  - Does not involve extra processing

## Proof of Concept

This is a composition patent that covers several families of chemical compounds

- Synthesis and structural characterization of new compounds
- Electrochemical characterization
- Preliminary tests in Li-ion battery environment
- TRL level between 3 and 4 - Needs further testing in Li-ion cells

## Technology Differentiation

- It provides a rich chemical reservoir to tailor interphasial chemistries on both anode and cathode
- Chemicals of this invention have been identified as useful additives to improve the performance of anode or cathode materials or both
- The some may be found useful for future electrode materials

## Technology Agreements

Either a patent license or CRADA is sought

- The technology would benefit from a collaboration between the inventor team and the commercialization partner in order to speed the development to the market.
- A patent license would also be acceptable path towards commercialization
- Technology is a TRL between 3 and 4, and a provisional patent application has been filed

## Technology Applications

- This invention can be applied in any device employing materials of large electrochemical potential
- Li-ion battery stability relies on interphasial chemistries on both anode and cathode surfaces
- Innovation in electrolyte technology can enable new capability of Li-ion chemistry and benefit both military and commercial applications, such as **hybrid electric vehicles**

