

INNOVATIVE ELECTROLYTE SOLUTION FOR HIGH VOLTAGE LITHIUM-ION CELLS (BIRAD)

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The Problem

During recent years, the popularity of electric vehicles and hybrid electric vehicles has markedly increased worldwide. However, the main disadvantage of electric vehicles is their limited driving range, due to low battery capacity. Increasing driving range requires more batteries contributing to price, weight and volume. A practical solution would be high voltage and high energy density cathode materials.

However standard electrolyte solutions based on alkyl carbonates are oxidized at high voltage above 4.5V.

In order to use high voltage cathode materials, the electrolyte solution must resist oxidation above 4.5V. Partially fluorinated solvents demonstrate an enhanced oxidation resistance above 4.5V and are favorable to high voltage cathodes.

The Solution

We propose a novel an electrolyte solution compatible with high voltage batteries, having superior performances in terms of enhanced stability, reduced manganese dissolution from the cathode and reduced capacity fading upon cycling.

The Commercial Benefit

The invented electrolyte solutions enable the development and manufacturing of high voltage and high capacity cathode material namely Lithium Manganese Rich (LMR) cathode materials.

Market Potential

The global electric vehicle market was valued at \$118.864 million in 2017, and is expected to reach \$567,300 million by 2025, growing at a CAGR of 22.3% from 2018 to 2025. Primarily designed to replace conventional ways of travel that cause environmental pollution, electric vehicles have gained popularity owing to numerous technological advancements. The electric vehicle outperforms the conventional vehicle providing higher fuel economy, low carbon emission and maintenance, convenience of charging at home, smoother drive, and reduced sound from engine.

Target Markets/Industries

Electric Vehicle Market

Automotive Battery Market

Intellectual Property

Patent pending

Team: Primary Inventor

Prof. Doron Aurbach

Prof. Doron Aurbach is a professor in the Department of Chemistry.

He is a member of Bar-Ilan University (BIU) Senate.

Prof. Aurbach is a director of the Energy Center at the Bar-Ilan University Institute of Nanotechnology and Advanced Materials.

He is a leader of the Israel National Research Center for Electrochemical Propulsion, which includes 22 research groups from 5 leading academic institutions.

Prof. Doron Aurbach works systematically on R&D of a wide variety of power sources, electronically conducting polymers, and water desalination and purification.

He mentored 55 PhD students and 70 MSc students and has supervised 20 post-doctoral fellows.

Prof. Doron Aurbach published more than 540 research papers in leading electrochemistry, materials science and physical chemistry journals.

Dr. Shalom Luski

Dr Shalom Luski is a Team leader within Prof Aurbach's group.

Dr. Shalom Luski was is the Energy Storage Leader and Chief Scientist and Co-Founder of at ETV Energy Ltd.

Dr. Shalom Luski served as VP Chemistry and Consumables at Printar Ltd.

Dr. Luski serves as Chief Scientist and VP for Core Technologies of Power Paper Ltd.

Dr. Luski arrived came to Power Paper from Tadiran Batteries Ltd., where he served for nine years as a senior scientist and project manager in the development of new types of lithium batteries.

Shalom has been granted 14 three patents and published 34 20 articles in professional journals.

Dr. Luski studied in the Department of Inorganic and Analytical Chemistry at the Hebrew University of Jerusalem, where he received his B.Sc., M.Sc. and Ph.D. degrees in distinction.

Future Research

We plan to further develop electrolyte solution compatibility with next generation anodes like silicon.

The Opportunity

Companies are invited to license our patent through a licensing agreement with sponsored research.

Contact for more information:

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