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Energy for the future

New sustainable cathode material for its application on Lithium/Sulfur batteries

Focus Sectors
- Energy
- Lithium/Sulfur batteries
- Cathode materials
- Sustainable batteries

Project Key Words
- Efficient cathode for LiS batteries
- Vegetable oil/sulfur polymer
- Reduction of Shuttle Effect
- High sulfur content

Development Status
- Proof of concept
- First scaling step

Patent Procedure Status
- Patent application filed

Chances for Cooperation
- Licensing
- R&D Cooperation
- Patent right transfer

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Innovation and competitive advantage

Batteries have become one of the fundamental parts of any new electrical appliance. In the current scenario, where electrical devices constantly increase their energy demand, the need for more efficient, sustainable and high-capacity batteries is obvious.

Lithium/Sulfur (LiS) batteries are the most promising next generation alternative to the conventional Lithium-Ion batteries, which are limited by their non-extendible energy density.

High energy density, low costs and low toxicity are important advantages generally linked to LiS batteries.

We presented here a novel cathode material for LiS batteries with important added strengths:

- Simple, sustainable and **cost-effective production**
- Prevention of Shuttle Effect
- High sulfur content
- **Higher cycle stability**

Customer benefit

Our technology presents an innovative material for the fabrication of battery cathodes based on vegetable oil and elemental sulfur. It represents the **first 100% sustainable cathode material** for LiS batteries!

The solvent-free synthesis involves two non-toxic and affordable reactants and is scalable to produce large volumes, according to the potential applications.

Your cost advantage:
Our technology: <1€/Wh
$LiCoO_2$ cells: 3€/Wh

Est. market volume (2030):
$10 billion

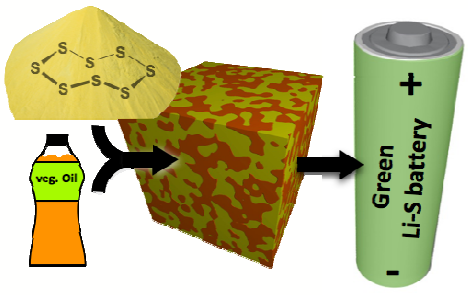
Technical Description

The production of this pioneering material relies on highly unsaturated vegetable oils, which are available in large quantities and variation, adding flexibility to the synthesis and thereby allowing for material property adjustments. The synthesis is performed using reproducible conditions.

Double bonds in vegetable oils are the reactive point to which sulfur can bind. A cross-linked polymeric network is formed, that accommodates small sulfur particles, thereby preventing the diffusion of soluble reduction products. This results in an extended lifespan of the cathode and increases the efficiency of the battery.

The cross-linked, sulfur based composite material contains a high sulfur percentage (up to 80 wt%). This polymer can be used, without further treatment, as cathode in LiS batteries.

Our solution allows efficiently overcoming some of the typical drawbacks of LiS batteries, as the short lifespan, limited efficiency by loading and self-discharge.



This technology offers exciting possibilities to achieve more efficient and cost-efficient solutions for the expansion of LiS batteries on the market.

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