MaLiSu

Nanomaterials for future generation Lithium Sulphur batteries

www.iws.fraunhofer.de/malisu

The MaLiSu project started 01.05.2012. Aim of the project is the development of next generation batteries with significantly enhanced energy densities based on the lithium sulfur chemistry. The energy density of a battery determines the maximum autonomic driving range of electric vehicles and is regarded as the major bottleneck towards broad replacement of fuel driven vehicles until now. Under the leadership of Fraunhofer IWS, the consortium including Uppsala University, Dresden University of Technology, Varta Micro Innovation GmbH and SGL Carbon GmbH work together in this cooperative project covering aspects from basic electrochemistry and material research up to prototype level production.

Since the project start significant progress towards the project objectives has been achieved. The influence of the nanostructure in carbons on their performance in sulfur carbon nanocomposite cathodes has been studied. The carbon materials act as conductive and stabilising framework for the non-conductive sulfur-species. With optimised materials extremely high sulfur utilisation at high sulfur loadings was obtained, exceeding specific capacities of 1.200 mAh g-1 (sulfur mass) and 800 mAh g-1 (electrode mass) being stable for over 50 cycles. Various electrolyte additives were studied and new compounds were identified further enhancing the sulfur utilisation and inhibiting the degradation mechanisms. High performance electrodes were produced through an environmental-friendly dry process route allowing for reproducible results and areal capacities as high as 5 mAh cm-2.

The next important steps of the project will be to scale up the technologies and transfer the results onto industrially prototype level. The researchers within the consortium are optimistic to reach their goal of prototype battery cells exceeding energy densities of 400 Wh kg-1. This result would be an important milestone towards significantly extended driving range of electric vehicles.

Project Data

Funding/€	Total cost/€	Duration
1.285.919	1.827.283	36 months

Partners

Fraunhofer IWS, DE

VARTA Micro Innovation GmbH, AT

SGL Carbon GmbH, DE

Uppsala University, SE

Technical University Dresden, DE

>>Lithium-Sulfur-Battery<<