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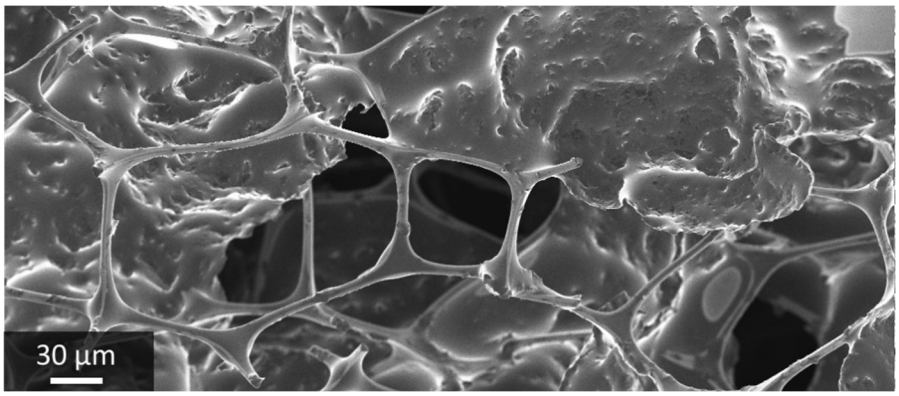
RWTH Technology

Electrodes for high energy batteries



Challenge

Electrochemical energy storage beyond the lithium-ion battery needs new concepts and materials that produce cheaper and more powerful batteries. Research focuses are conversion-based cell chemistry, such as that found in metal-air batteries. In particular, the Li-O_2 system offers theoretically an excellent energy density. In order to achieve the promised high capacities, electrodes with an adapted pore structure and a large electrochemically active surface area are required.

Solution

With the aim of an optimized reaction interface, *dispersion electrodes* were developed as part of an experimental investigation of Li-O_2 batteries. By directly mixing a conductive cathode active material with a liquid electrolyte, a dispersion is produced that can be used as a functional electrode in batteries. The mixture is absorbed by a substrate, which at the same time enables the transport of electricity and substance in relatively thick electrodes. In contrast to conventional solid-state electrodes, which are wetted with electrolyte, the electrochemically active interface of a dispersion electrode can be maximized via the mixing ratio of solid and liquid. Using the example of Li-O_2 batteries, the proof of concept was provided that gas diffusion electrodes can also function without a rigid or elaborately produced pore structure.

Advantages

- Simple process control (without additional solvents or binders)
- Material selection and mixing ratio can be adjusted
- Transferable to other electrochemical systems (e.g. electrochemical reactors, electrolyzers)

Status

- European patent application pending, US patent application pending and German patent application pending
- Proof of concept

RWTH Aachen University is looking for partners for patent exploitation and research partners for development cooperation.

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#2145

Fields of application
electrochemistry
Batteries
Fuel cells

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#dispersion; #lithium-oxygen batteries #Li-Ion

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