

AKE 8: Energy for Mobility - High Performance Batteries for Vehicles and Clean(er) Marine Transport

Time: Tuesday 16:15–17:15

Location: RW HS

Invited Talk AKE 8.1 Tue 16:15 RW HS
Performance analysis of Lithium-ion-batteries: status and prospects — ●ELLEN IVERS-TIFFÉE, PHILIPP BRAUN, and MICHAEL WEISS — Institute for Applied Materials (IAM-WET), Karlsruhe Institute of Technology (KIT), D 76131 Karlsruhe, Germany

The electrode microstructure, i.e., the distribution of active material, carbon black, and pore phase, as well as surface area and tortuosity strongly affects the overall performance of Lithium-ion-batteries. Contributions by ohmic resistance R_0 , contact resistance R_{CC} , charge transfer resistance R_{CT} and solid-state diffusion resistance R_{Diff} , which all occur with different time constants, have been quantified for various state-of-the-art Lithium-ion-batteries by a combination of (i) electrochemical impedance spectroscopy measurements (EIS) with (ii) time-domain measurements (TDM).

A newly developed one-dimensional model for Lithium-ion batteries is presented, which simulates battery performance by linking two phase transmission line models for both electrodes with an ohmic resistance for the liquid electrolyte. Variations of (i) electrical parameters, i.e. ionic and electronic conductivity, (ii) electrochemical parameters, i.e. charge transfer resistance and solid-state diffusion, and, (iii) mi-

crostructure parameters, i.e. phase tortuosity and electrode thickness, indicate the most important material and design parameters for high-performance batteries.

Invited Talk AKE 8.2 Tue 16:45 RW HS
Clean Energy Revolution in Sea Transport — ●CHRISTOPH KANDZIORA — Siemens AG, Erlangen

Since years the conflict between groups with focus on environmental protection and concerned residents versus the city of Hamburg on whether the excavation of the Elbe river to give bigger container ships access to the Hamburg port is in the news. These enormous ships cannot only carry more goods than their predecessors but also have to fulfill more and more strict regulations especially regarding air pollution. To compete with these regulations the shipbuilding industry and their suppliers have to think about new propulsion systems. For example conventional diesel engines need to be enhanced with the possibility to run on LNG. Additionally new ways of power generation and usage like fuel cells or additional efficiency measures need to be considered. Finally all these measures have big impact on the installation on board of vessels, e.g. on the power grid.