

CELEST Member Short Profile



Reiner Mönig

Reiner Mönig is a group leader at the Institute of Applied Materials – Mechanics of Materials and Interfaces. His interdisciplinary group focuses on reaction and degradation mechanisms of materials for batteries. Reiner studied physics at University of Karlsruhe (now KIT) and completed a Ph.D. in materials science at the Max-Planck-Institute for Metals Research / University Stuttgart. Before coming to KIT he spent three years as a postdoctoral associate in the Department of Materials Science and Engineering at Massachusetts Institute of Technology.



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Research areas

Reiner's group deals with the experimental investigation of reaction and degradation mechanisms in materials for batteries. Of interest are the chemistry and structure of materials and their connection to aging and degradation of electrochemical cells. Typical examples of this type of research are the reversibility of phase transformations or the formation of interphases that not only determine the performance of a cell but also often are critical for its reliability. Of further interest is the coupling between mechanics and electrochemistry and its consequences. Metal batteries are a major theme of the group. Here the fundamental mechanisms governing the deposition and dissolution of selected metals are explored.

Lab equipment (at campus north of KIT)

In his research, electrochemical experiments are typically combined with microscopic, spectroscopic or mechanical measurements. In many cases experiments are performed operando or intermittently. In particular, for higher numbers of cycles the intermittent observations can be advantageous compared to operando measurements. The equipment that is directly available to the group includes different types of electron and ion microscopes (SEM, FIB, Helium-ion microscopy) as well as a custom-built high speed and high resolution light microscope. Structural processes are observed operando by Raman and by a dedicated XRD. Electrochemical processes at interfaces or inside electrodes are also studied with high sensitivity by a quartz microbalance and a substrate curvature setup.

Reiner Mönig @ IAM-MMI

Link IAM-MMI

Link lab equipment

https://www.iam.kit.edu/mmi/Battery_materials.php

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