

CELEST Member Short Profile



Helge S. Stein

Helge Stein is leading the Applied electrochemistry group since the summer of 2020. His research groups aims at accelerating the discovery, understanding, and upscaling process of new materials, interfaces, and interphases through the integrated use of high-throughput experimentation and data science. Before Joining KIT he was a Staff Research Engineer and Postdoc at the California Institute of Technology and obtained his PhD in mechanical engineering at the Ruhr-University Bochum with summa cum laude and the Eickhoff Prize in 2017. His group built and operates the Platform for Accelerated Electrochemical Energy Storage Research (PLACES/R) which is the possibly largest and most comprehensive single site materials acceleration platform for energy storage materials. At KIT he is the Topic speaker for Storage at the KIT Energy Center, AI for Materials Speaker at the Graduate School EnZo and leader of the Research Unit "Interfaces" at the POLiS cluster of Excellence. In the large scale Horizon 2020 project BIG-MAP he is leading the workpackage of "AI accelerated materials discovery" aiming to build a pan-european platform integrating AI guided materials simulation and experiments.

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Research areas

Combinatorial materials synthesis using reactive magnetron sputtering, combinatorial co-precipitation, and high-throughput electrodeposition. High-throughput correlative spectroscopy using FTIR, Raman, XRF, near ambient pressure XPS, imaging and UV-Vis spectroscopy on self-build and conventional instrumentation. Laboratory automation using in-house developed orchestration frameworks. Building laboratory interfaces by deploying ontology based lab orchestration. Model systems for understanding of SEI growth, synthesis of new anode and cathode alloys, combinatorial formulation of electrolytes, high-throughput NMR. High-throughput synthesis of SEIs by scanning droplet cell electrochemistry. Electrocatalyst design for OER and ORR (Air-batteries and aqueous catalysis). Automatic battery assembly in the CR2023 and protocell format.

Lab equipment

SEMESTER Facility in Ulm
NAP-XPS, 2x FTIR, 3x Raman, XRF, NMR, Imaging, Sputtering Chamber, AutoBASS, Cellerate Protocell, Cell Cycling Robot, Data Management, GPU Server, HELAO, FINALES, Pipetting Robots

Helge S. Stein @ IPC / HIU	Link IPC / HIU	Link lab equipment
https://hiu-batteries.de/en/researches/research-groups/applied-electrochemistry/	https://www.ipc.kit.edu/ https://hiu-batteries.de/en/	

Partners

