Click here to visit the Webversion

NEWSLETTER ISSUE 5

Welcome...

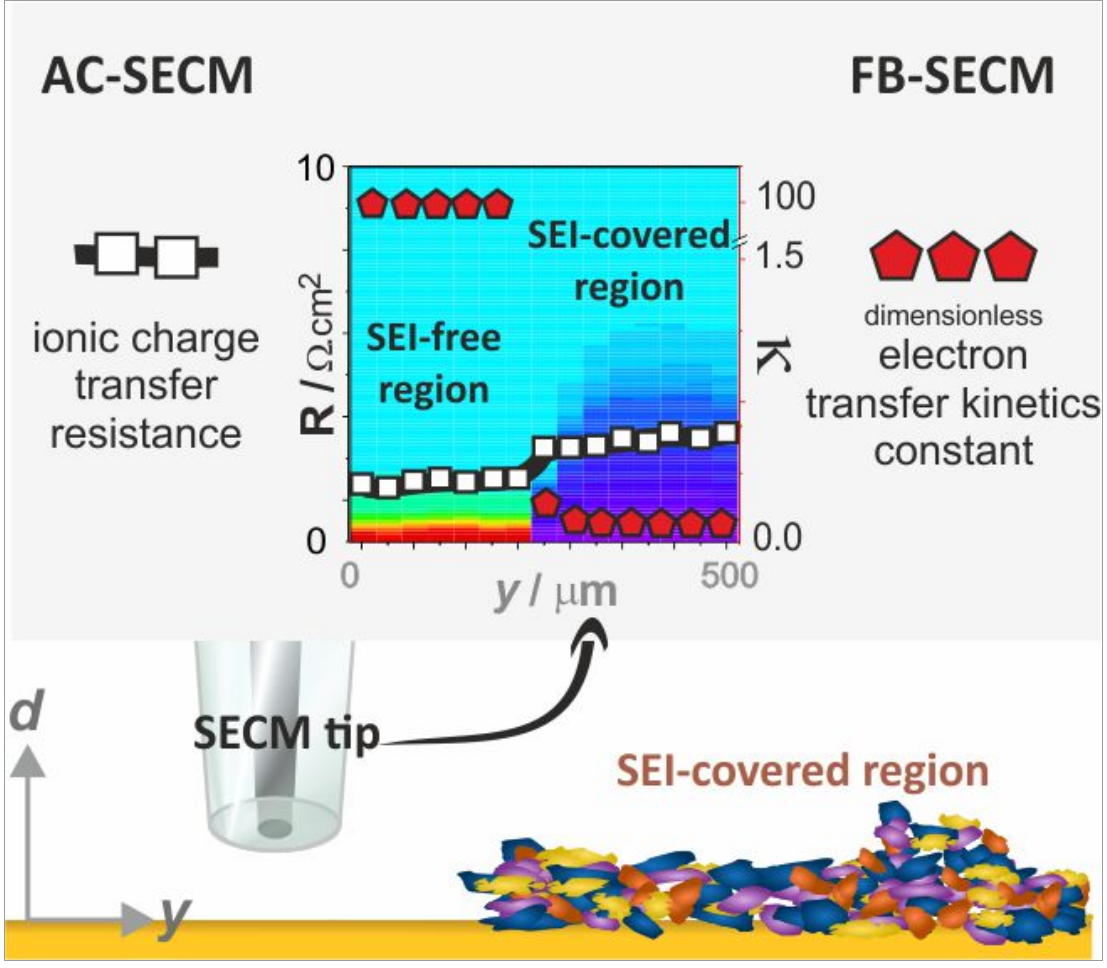
… to the 5th issue of our NanoBat newsletter. We were rather busy these past 6 months with publishing a number of articles ranging from nano-electrochemistry and metrology cell impedance characterization, to pilot line testing. We are particularly proud that two of these publications were realized in cooperation with our stakeholders! We are also pleased to introduce you to one of our team members, Enrique García-Quismondo, and tell you more about our contributions to IndTech 2022 and MIKON 2022.

The NanoBat consortium at our last progress meeting in Madrid.
Find more information here.

Correlative Electrochemical Microscopy for the Elucidation of the Local Ionic and Electronic Properties of the Solid Electrolyte Interphase in Li-Ion Batteries

Publication in Nano-electrochemistry

The solid-electrolyte interphase (SEI) plays a key role in the stability of lithium-ion batteries (LIB) as the SEI prevents the continuous degradation of the electrolyte at the anode. We combine the feedback and multi-frequency alternating-current modes of scanning electrochemical microscopy (SECM) for the first time to assess quantitatively the local electronic and ionic properties of the SEI varying the SEI formation conditions and the used electrolytes in the field of Li-ion batteries.



Find the full publication here.

Process-Product Interdependencies in Lamination of Electrodes and Separators for Lithium-Ion Batteries

Publication Pilot Line and Cell Testing

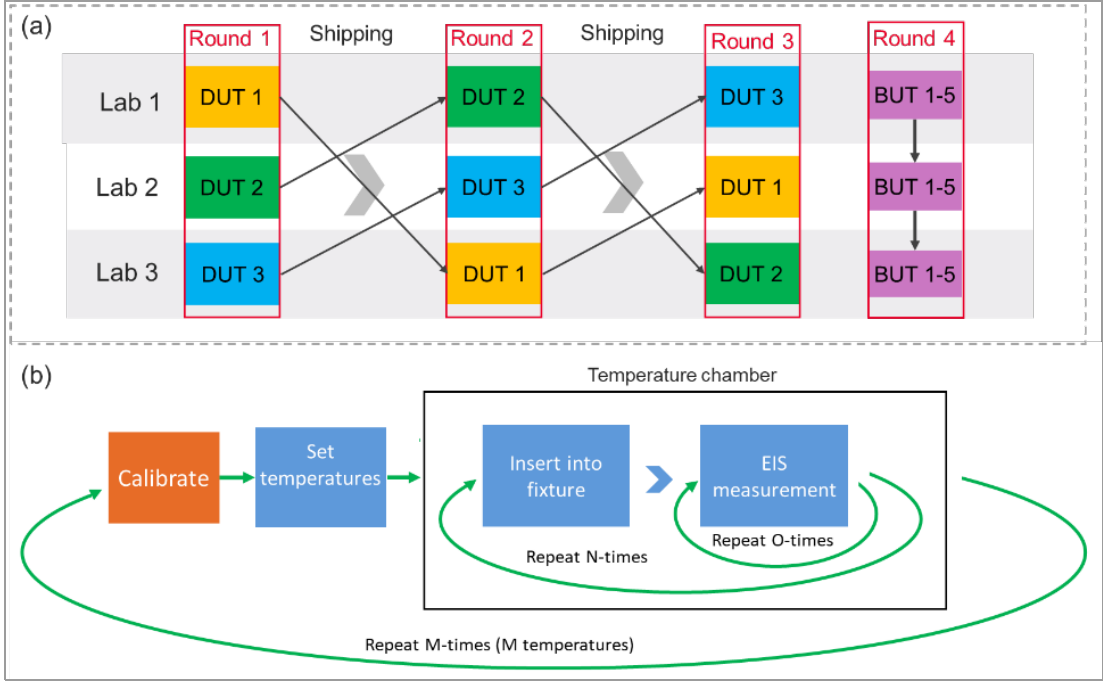
In today's cell production, the focus lies on maximizing productivity while maintaining product quality. To achieve this, the lamination of electrode and separator is one key process technology, as it bonds the electrode and separator to form mechanically resilient intermediate products. This paper addresses the investigation of interdependencies and proposes three characterization methods (grey scale analysis, high potential tests, electrochemical cycling and C-rate tests).

Find the full publication here.

Electrochemical impedance spectroscopy error analysis and round robin on dummy cells and lithium-ion-batteries

Publication in Metrology Cell Characterization – in collaboration with our stakeholders BMW and Infineon

An interlaboratory Round-Robin comparison between three-labs is conducted where calibrated electrochemical-impedance-spectroscopy (EIS) is measured on prismatic cell dummies and prismatic batteries. Advanced EIS calibration workflow is employed allowing for precise measurements of low micro-Ohm impedances in a broad frequency range of 50 mHz to 10 kHz. Significant systematic-error corrections are obtained from the calibration. Additionally, the paper provides insights into best measurement practices for battery impedance characterization.

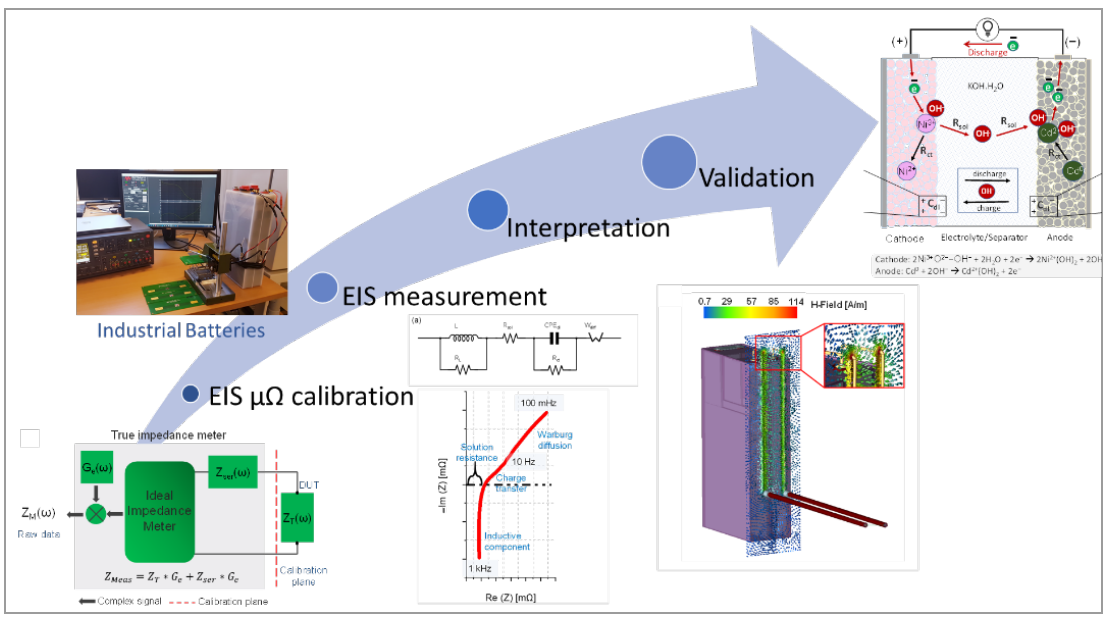


Find the full publication here.

Advanced Electrochemical Impedance Spectroscopy of Industrial Ni-Cd Batteries

Publication in Metrology Cell Characterization – in collaboration with our stakeholders SAFT

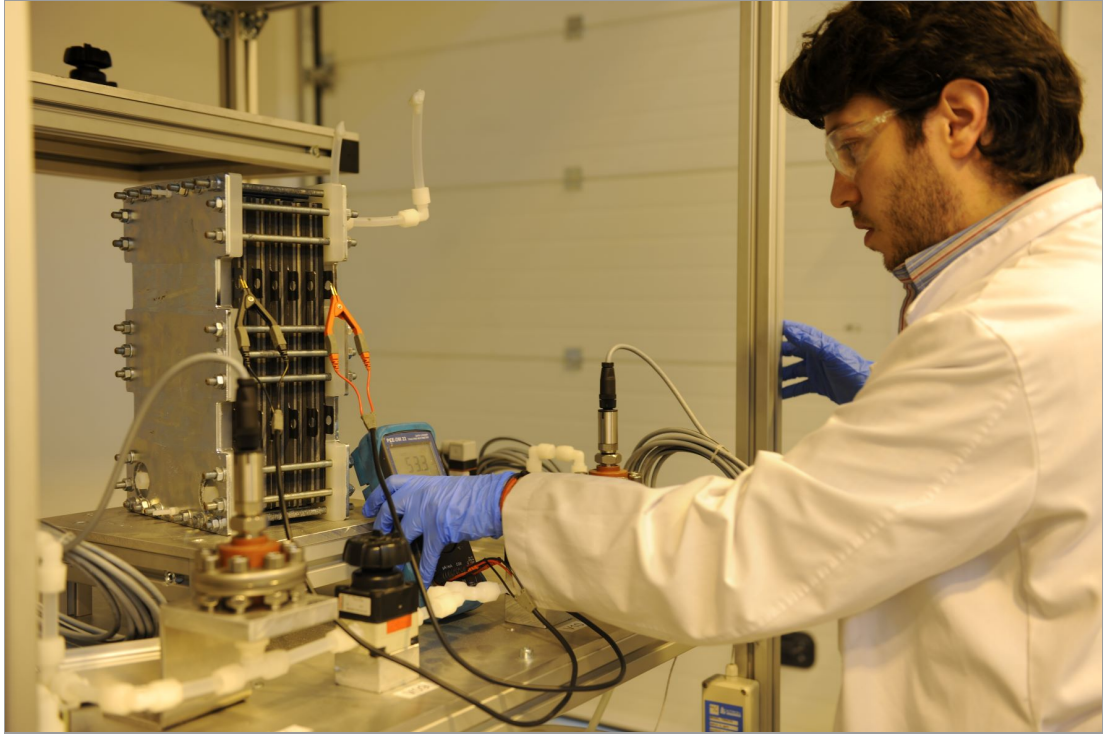
Advanced EIS was applied to characterize industrial Ni-Cd batteries and to investigate the electrochemical redox processes. An EIS calibration process that uses short and shunt standards with known resistance and reactance values was employed. The EIS calibration significantly improved the measurements, particularly at high frequencies above 200 Hz, with differences of 6–8% to the uncalibrated impedance. Using equivalent circuit modelling (ECM) the main electrochemical parameters of the cells are extracted. For instance, from the charge-transfer resistance, we computed the exchange current density resulting in 0.23 A/cm2, reflecting high intrinsic rates of the redox electron transfer processes in Ni-Cd cells.



Find the full publication here.

Meet the people behind NanoBat – Enrique García-Quismondo

Enrique García-Quismondo is Senior Assistant Researcher at **Imdea Energy Institute** (Spain). His career has been developed in private companies working in the R&D centre of the battery manufacturer Exide Technologies I Tudor and in the R&D laboratory of the engineering firm Tecnicas Reunidas. Currently, as a member of the Electrochemical Processes Unit at Imdea, he has specialized in industry-driven research using new concepts generated in the laboratory to develop advanced technologies and their transference to companies. His experience with electrochemical devices extends to cell, stack and systems design, as well as construction and testing of emerging technologies, with a particular emphasis on energy storage systems such as redox flow batteries, metal-air batteries and lithium-ion batteries. He is one of the co-authors of our most recent publication "New Technique for Probing the Protecting Character of the Solid Electrolyte Interphase as a Critical but Elusive Property for Pursuing Long Cycle Life Lithium-Ion Batteries". In addition to NanoBat, he is also involved in several other research projects oriented to battery ageing studies and modelling for developing and optimizing battery testing methods.



You will find Enrique's profile at Imdea Engery here.

Recap: NanoBat at IndTech 2022

On June 27-29, 2022, a group of NanoBat partners took part in the Conference on Industrial Technologies 2022 (IndTech 2022) held in Grenoble, France.
Throughout the three conference days, we maintained a NanoBat booth at the sustainability village where visitors could gain insights into our project work: there was a demo of KEYS Field Fox with a GHz resonator from QWED, and prototypes from the labs of the project partners were presented, as well as pouch cells from AIT. In addition, we took the opportunity to participate in a visit to the ST Microelectronics chip manufacturing plant and processing facilities. And of course, we engaged in interesting discussions and shared our ideas about EU goals and main strategies in terms of battery technologies.

Be encouraged to have a look at our wrap up with some very unique impressions that is provided here.

MIKON 2022 - Women in Science workshop

This year's MIKON conference took place in the beautiful city of Gdansk, Poland on September 12 – 15, 2022. NanoBat was present with quite a variety of activities thanks to our Polish partner QWED. The activities included the organization of the Women in Engineering Matinee, a course on EM Modelling and a Workshop on Materials' Characterisation in Microwaves and Millimetre Wave Ranger. In addition, four papers by NanoBat partners QWED and PLEIONE were published and presented throughout the conference.

A full report on our activities at MRW 2022 is available here..

We hope that you enjoyed the 5th issue of our newsletter and look forward to continuing our exciting journey with you.

Connect with us:

Facebook **Homepage**

Contact **Privacy Policy**

The NanoBat project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 861962.

Legal Notice:
Eurice GmbH
Heinrich-Hertz-Allee 1
66386 St. Ingbert