Sensolytics Scanning Electrochemical Microscope





Description

The SECM (Scanning Electrochemical Microscope) enables electrochemical measurements at the microscopic level to detect local differences in battery performance.

- The ability to monitor electrochemical reactions in real time provides detailed insights into the reaction dynamics and degradation mechanisms within the battery materials
- The device allows the investigation of surface and interfacial processes that are critical to battery efficiency and stability
- Specific areas within a battery anode or cathode surface can be investigated to identify inhomogeneities
- Localized measurements contribute to the improvement of battery design



Schematical setup of a SECM experiment.

Specifications

- Scan range: 25x25x25 mm range at 20 nm resolution
- Z-axis equipped with a 100 µm piezo at 1 nm resolution
- Shearforce-SECM option available
- High-resolution optical system

Local measurements of properties in liquids:

Current-distance curves for hindered diffusion resulting in negative feedback; different ĸ values and diffusion controlled feedback, positive the inset 💺 depicts the principle of diffusion controlled positive feedback and for hindered diffusion, negative feedback, I_m showing the steady state current in bulk solution.



Further information



A selection of modes of operation of a SECM, illustrating how the current response, expressed as a normalized quantity, changes upon imaging certain features. Arrows represent the flow of the electroactive species (or ions) to the UME.

Publications

- K. Palanisamy, S. Daboss, J. Romer, D. Schäfer, M. Rohnke, J. K. Flowers, S. Fuchs, H. S. Stein, M. Fichtner, C. Kranz, *Batter. Supercaps* **2024**, *7*, e202300482.
- [2] S. Daboss, F. Rahmanian, H. S. Stein, C. Kranz, *Electrochem. Sci. Adv.* 2022, 2, 1–10.
- [3] D. Schäfer et. al, *Adv. Energy Mater.* **2024**, *14*, 2302830.



