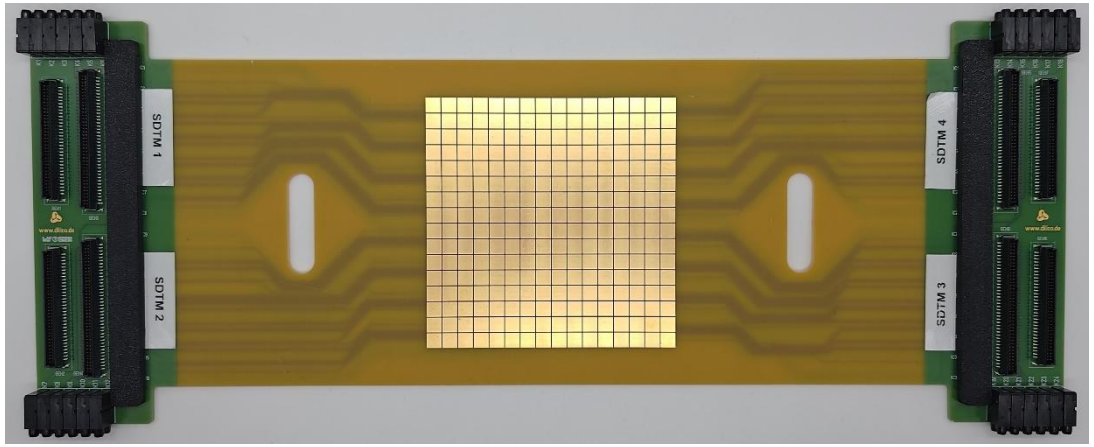
TU Clausthal

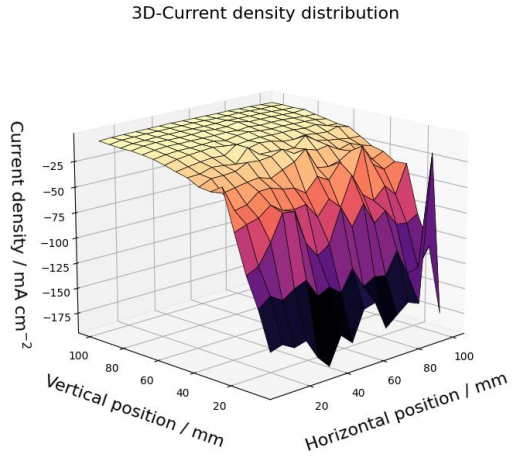
EST
Forschungszentrum
Energiespeichertechnologien

Master's thesis ‘Development of an electrolysis cell design for local current density measurement’ - German / English

The development of electrochemical processes for the production of chemicals is gaining in importance due to their possible direct integration with renewable electricity sources. During the scale-up of these novel electrochemical systems, the local effects inside the cell due to flow and concentration distributions, gas fraction and non-uniform surface activity are often poorly understood. For this reason, the local effects have to be determined experimentally during the operation of electrochemical cells with components that correspond to industrial designs. In the project “CellDiagnostics”, local current distribution is measured during operation of alkaline water electrolysis to develop a reliable methodology for the investigation of these local effects. For these measurement, a measurement card with 256 individual measurement spots has to be integrated into an alkaline water electrolysis cell.

This work consists of the design and experimental testing of a new electrochemical cell construction that allows for the local current density measurement and impedance spectroscopy against an integrated reference electrode. An automated testing setup, the current density card (pictured below) and a prototype cell design are already in operation at the EST in Goslar.





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