Bericht zum Reisestipendium Nr. 3910 der Max-Buchner-Forschungsstiftung

„Investigating the Effect of Catalyst Configuration on the Performance of Silver-Based Membrane Electrode Assemblies for Electrochemical CO_2 Reduction"

PRiME (Pacific Rim Meeting on Electrochemical and Solid State Science) 2024
(6. – 11. Oktober 2024)

Lydia Weseler, Clausthal University of Technology,
Institute of Chemical and Electrochemical Process Engineering

Electrochemical CO_2 reduction is a promising technology in the context of climate change, as it can convert excess CO_2 captured from air or flue gas to valuable carbon products using renewable energies at peak times. Nevertheless, the system is lacking the energy efficiency necessary for industrial application. One way to improve this is by reducing the ohmic resistances caused by the electrolyte gaps to use membrane electrode assemblies (MEAs). These typically include gas diffusion layers (GDLs) impregnated with a catalyst ink composed of the catalyst, solvents, and an ionomer. Especially the catalyst and ionomer alongside the membrane remarkably impact the performance of the MEAs. While many different studies in literature use different combinations of catalyst and ionomer, the results obtained from those measurements are hardly comparable due to the different manufacturing and test procedures. The ongoing study also presented at the above-mentioned conference therefore aims to elucidate the influence of the two components varied within the same catalyst ink and afterwards tested in the same test setup.

As the concept of catalyst-coating GDLs is, at least in the context of CO_2 reduction, quite new within the group in Clausthal, visiting conferences for exchange with other researchers is very helpful. With more than 5,000 participants, PRiME 2024 was an extremely large event and topics were therefore very diverse. In contrast to most other conferences, there was a whole session on electrochemical CO_2 reduction which gave many interesting insights of other groups' work.